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ABSTRACT

The federal government uses various guidelines for identifying the poor for eligibility in public assistance programs and for measuring the economic well being of the population. In 1974, the United States Department of Agriculture revised its existing low-cost, moderate-cost, and liberal food plans and in 1975 replaced the economy food plan with the thrifty plan. These plans incorporated the recommended dieterary allowances set in 1974 and food consumptions patterns from the 1965-66 Survey of Household Food Consumption, the most recent such survey. This technical report consists of five papers which cover in detail what the food plans are, how they were developed, and how they have been revised. They include: (1) a description of the United States Department of Agriculture Family Food Plans for 1974; (2) a description of the Thirfty Food Plan, which replaced the economy plan in 1975 as the least costly of the food plans; (3) a discussion of the effect of household size on the cost of diets that are nutritionally equivalent, including a description of the economy of scale factors which are used in estimating the cost of food at home for families of different sizes; (4) issues and answers about the Thrifty Food Plan; and (5) a description of food plans, comparable to the Thrifty Plan and the low-cost plan, developed using nutritional criteria that differed from those used for the United States Department of Agriculture plans. (Author/AM)

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THE MEASURE OF POVERTY

Technical Paper XII

Food Plans for Poverty Measurement

BEST COPY AVAILABLE

By: Betty Peterkin
U.S. Department of Agriculture

UD016925

U.S. Department of Health, Education, and Welfare

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November 15, 1976

Virginia Trotter
Assistant Secretary for Education
Department of Health, Education,
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William A. Morrill
Assistant Secretary for Planning
and Evaluation
Department of Health, Education,
and Welfare

I am pleased to issue Technical Paper XII, "Food Plans for Poverty Measurement". It contains supporting data for the report entitled The Measure of Poverty which was prepared in compliance with section 823 of the Education Amendments of 1974. The paper was prepared for the Poverty Studies Task force by Betty Peterkin of the Consumer and Food Economics Institute, Agricultural Research Service, U.S. Department of Agriculature. This paper contains five documents; Part A, 'USDA Family Food Plans, 1974'; Part B, 'The Thrifty Food Plan'; Part C, 'The Effect of Household Size on the Costs of Diets That Are Nutritionally Equivalent'; Part D, 'Issues and Answers About the Thrifty Food Plan'; and Part E, 'Food Plans for Measures of Poverty'.

Bette Mahoney

Bette Mahoney, Chairman
Poverty Studies Task Force

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PREFACE

Section 823 of the Education Amendments of 1974 (PL 93-380) requires a thorough study of the manner in which the relative measure of poverty for use in the financial assistance program, authorized by Title I of the Elementary and Secondary Education Act of 1965, may be more accurately and currently developed.

That financial assistance program is administered by the Commissioner of Education, through the Office of Education, Department of Health, Education, and Welfare. An important feature is the use of a formula prescribed by Section 103 of the Elementary and Secondary Education Act for the annual distribution of Federal funds to school districts. A significant factor in the formula is the number of school-age children 5 to 17 in poor families within each school district. The measure of poverty which is used, and which is the subject of the study mandated by Section 823, is the Federal government's official statistical definition of poverty (also known as the Orshansky, OMB, Census Bureau, or Social Security poverty lines).

Other work related to poverty measurement has been called for in recent legislative acts. In the Comprehensive Employment and Training Act, the Secretary of Labor is directed to develop and maintain comprehensive household budget data at different levels of living, including a "level of adequacy." Any such review of the level of adequacy must necessarily be closely related to measures of poverty. The Housing and Community Development Act of 1974 gives the Secretary of HUD authority to adjust the poverty measure to reflect local variations in the cost of living. The Conference Report accompanying it directs the Secretary to develop or obtain data with respect to the "extent of poverty" by metropolitan areas and to submit such data to the Congress as part of a March 31, 1977, report.

Because of the broad scope of the subject matter, coverage of the study of the measure of poverty mandated by Section 823 of the Education Amendments of 1974 was extended to include implications of the study findings for the poverty-related programs of all affected Federal departments and agencies. The Title I program of the Elementary and Secondary Education Act was given the most detailed treatment, to meet the legislatively-mandated specifications for the study as well as to serve as a primary example of application of the concepts of poverty measurement to Federal programs. The findings of the study are published in a report entitled, "The Measure of Poverty." An important objective of the study was full discussion and documentation of the major elements of currently applied and potentially usable poverty measures. Material containing essential supporting documentation for the study was assembled as technical papers. These have been written to stand alone as complete technical treatments of specific subjects.

The study was performed under the direct guidance of a Poverty Studies Task Force of the Subcommittee on the Education of the Disadvantaged and Minorities, Federal Inter-Agency Committee on Education. Technical papers were prepared at the request of, under the direction of, and subject to review by the Task Force members. Some papers are primarily the work of one or two persons; these are attributed to their authors. Others result from the collective input of Task Force members or advisors and no specific attribution is given except to the Task Force, as a whole.

The following listings show members of the Poverty Studies Task Force by appropriate Federal departments and agencies, and the titles and authors of the technical papers.

This report contains Technical Paper XII, Food Plans for Poverty Measurement. It was prepared by Betty Peterkin of the Consumer and Food Economics Institute, Agricultural Research Service, U.S. Department of Agriculture.

To obtain copies of the report, "The Measure of Poverty," or any of the technical papers, please write to:

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Subcommittee on Education for the Disadvantaged and Minorities

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TECHNICAL PAPERS

I.	Documentation of Background Information and Rationale for Current Poverty Matrix	Mollie Orshansky Social Security Administration
II.	Administrative and Legislative Usages of the Terms "Poverty," "Low Income," and Other Related Terms	Poverty Studies Task Force with assistance from Ellen Kraus
III.	A Review of the Definition and Measurement of Poverty	Urban Systems Research and Engineering, Inc.
IV.	Bureau of Labor Statistics Family Budgets Program	Mark Sherwood Bureau of Labor Statistics
V.	The Consumer Price Index	Jill King Mathematica, Inc.
VI.	Wealth and the Accounting Period in the Measurement of Means	Nelson McClung and Eugene Steuerle Department of the Treasury
VII.	In-Kind Income and the Measurement of Poverty	Janice Peskin Health, Education, and Welfare
VIII.	The 1972-73 Consumer Expenditure Survey	Jill King Mathematica, Inc.
IX.	Inventory of Federal Data Bases Related to the Measurement of Poverty (a) Non-Census Data Bases (b) Census Data Bases	Connie Citro, Mathematica, Inc. Bureau of the Census
X.	Effect of Using a Poverty Definition Based on Household Income	Jack McNeil, Doug Sater, Arno Winard Bureau of the Census
XI.	Update of the Orshansky Index	Mollie Orshansky Social Security Administration
XII.	Food Plans for Poverty Measurement	Betty Peterkin Department of Agriculture
XIII.	Geographic Differences and Relative Poverty	Jack McNeil Bureau of the Census
XIV.	Relative Measure of Poverty	Stanley Stephenson Health, Education, and Welfare
XV.	Analytic Support for Cost-of-Living Differentials in the Poverty Thresholds	Thomas Carlin Department of Agriculture
XVI.	Implications of Alternative Measures of Poverty on Title I of the Elementary and Secondary Education Act	Abdul Khan and Herman Miller Health, Education, and Welfare
XVII.	The Sensitivity of the Incidence of Poverty to Different Measures of Income: School-age Children and Families	Survey Research Center University of Michigan
XVIII.	Characteristics of Low-Income Populations Under Alternative Poverty Definitions	Lawrence Brown Health, Education, and Welfare

INTRODUCTION

The Federal government uses various guidelines for identifying the poor for eligibility in public assistance programs and for measuring the economic well-being of the population. The official Federal poverty measure now used in deriving low-income population statistics is based on a formula developed by Mollie Orshansky of the Social Security Administration. The formula is based on the cost of the 1961 USDA economy food plan for families of different size and composition. The 1961 economy plan consisted of a nutritious diet, one that provided the amounts of food energy and nutrients--protein, vitamins and minerals--recommended at that time.

The National Academy of Sciences, National Research Council, establishes Recommended Dietary Allowances (RDA) for food energy and nutrients for men, women, and children of different ages. The RDA, revised about every five years to reflect new knowledge of human nutrition, have been used as nutritional goals for USDA food plans since the RDA were first issued in 1942. Although the acceptance of the RDA is attested by their role in the food plans, other nutritional standards have been derived. Among these are the standards set by the Food and Agricultural Organization (FAO) of the United Nations and the standard used by DHEW for evaluation of daily dietary intakes in the Health and Nutrition Examination Survey (HANES) of 1971-1973.

The RDA and other nutritional standards mentioned above are research-based standards of need. However, the specification of the nutritional standards has an element of subjectivity because knowledge about nutritional needs and variation in needs among individuals is incomplete. Levels are usually set to cover what are believed to be requirements for nutrients for almost all people. Therefore, food plans developed to meet such standards would be expected to provide generous amounts of nutrients for many people.

A large number of food items of different nutritional composition are available at widely varying costs. Therefore, diets at widely varying levels of cost can be developed, each providing recommended amounts of nutrients, but some being more palatable than others. USDA food plans at four levels of cost incorporate not only the RDA, but also actual consumption patterns of families at different spending levels. Hence, the least costly of the plans is not the least costly diet that would provide the RDA. Such a plan would not be suitable as a standard for food use and food costs of U.S. families. In developing the food plans there are subjective elements in determining the amount of deviation from consumption patterns that result in a palatable assortment of foods that a family might have the skill and opportunity to select.

The economy food plan used in the Orshansky formula reflected food selections and costs of low-income households from the 1955 Survey of Household Food Consumption conducted by the USDA. In 1974, USDA revised its low-cost, moderate-cost, and liberal food plans and in 1975 replaced the economy food plan with the thrifty plan. These plans incorporate

RDA's set in 1974 and food consumption patterns from the 1965-66 Survey of Household Food Consumption, the most recent such survey.

Five papers are presented here to cover in detail what the food plans are, how they were developed, and how they have been revised. The papers are:

Part A, USDA Family Food Plans, 1974, describes three of the food plans -- low-cost, moderate-cost, and liberal -- as revised in 1974.

Part B, The Thrifty Food Plan, describes the thrifty plan, which replaced the economy plan in 1975 as the least costly of the USDA food plans. The thrifty plan was used by the USDA in setting the coupon allotment for the Food Stamp Program, effective January 1976.

Part C, the Effect of Household Size on the Cost of Diets That are Nutritionally Equivalent, describes the economy of scale factors which are used in estimating the cost of food at home for families of different sizes.

Pard D, Issues and Answers About the Thrifty Food Plan, presents answers to some of the issues raised about the thrifty plan in the 55 day comment period after the plan was proposed for use in setting the coupon allotment.

Part E, Food Plans for Measures of Poverty, describes food plans comparable to the thrifty plan and the low-cost plan developed using nutritional criteria that differed from those used for the USDA plans. The additional plans were developed specifically for consideration, with the USDA thrifty and low-cost plans, in defining alternative measures of poverty.

PART A

USDA FAMILY FOOD PLANS, 1974

December 1974

Prepared By
Betty Peterkin

Three USDA family food plans--low-cost, moderate-cost, and liberal--have been revised. The estimated cost of food in the three plans, released by the Department each month, will be based on the revised plans starting with the December 1974 estimates.

Information about the new food plans is presented in four parts: (1) The 1974 food plans--why they were developed, what foods they contain, and how they relate to average food consumption patterns and to earlier plans, (2) the development of the 1974 food plans--the model and the data used, (3) the estimated costs for the food plans, and (4) the use of the food plans in family budgeting.

I. The 1974 Food Plans

What Are the Family Food Plans?

The food plans are amounts of foods of different types (food groups) that families might buy or obtain by home production to provide nutritious diets for family members at different levels of cost (Tables 1-3). Such food plans have served for more than 40 years as guides for estimating food needs and food costs of families and population groups. At each level of cost, amounts of foods for men, women, and children of different ages and for pregnant and nursing women are suggested. A plan for any family can be determined by totaling amounts of foods suggested for persons of the sex and age of family members. Food costs for a family following the plan can be estimated from costs of the plans released each month (Table 4).

Why Were New Food Plans Developed?

The food plans are revised from time to time to take into account new information about nutritional needs, nutritive values of foods, food consumption of families, and food prices. The quantities of food groups in the food plans were last revised in 1964.1/ Nutritional goals based on the Recommended Dietary Allowances (RDA) released in 1964 by the National Academy of Sciences-National Research Council (NAS-NRC) and food consumption data from a nationwide food consumption survey conducted by USDA in 1955 were used in developing these plans. Certain assumptions with regard to selections and price levels of foods within food groups in estimating costs of the plans were revised slightly in 1967. Revisions took into account food consumption and food prices reported in the nationwide household food consumption survey conducted by USDA in 1965-66. Plans were evaluated after the RDA were revised in 1968 and were found to provide acceptable levels of nutrients for which adequate reliable food composition data were available. Therefore, no changes in the plans were made.

New food plans were developed in 1974 for several reasons:

1. In 1974 the NAS-NRC revised the RDA.2/ Recommended amounts of some nutrients have been changed, and allowances for additional nutrients have been designated since the plans were revised in 1964. The 1974 RDA were used as the basis for the nutritional goals for the new food plans (see page12). Amounts of food energy (calories) in all three plans were limited to average needs as specified in the 1974 RDA. Allowances set in 1974 for protein and ascorbic acid for all sex-age categories are substantially lower than the 1964 allowances used in developing the earlier plans. Also, 1974 allowances for calcium, vitamin A value, riboflavin, and niacin for certain sex-age categories are lower than those set in 1964. On the other hand, thiamin allowances for all sex-age categories and iron allowances for some categories in 1974 are higher than those in 1964. Three additional nutrients for which allowances have been set since 1964, vitamin B_6, vitamin B_{12}, and magnesium, were considered in development of the plans.

2. The nutritive values of some foods have changed since the plans were developed in 1964. For example, many ready-to-eat cereals are now fortified with one-fourth or more of the RDA for many nutrients; enriched bread and flour have more thiamin, riboflavin, and niacin added than in 1964. New information on the content of nutrients in foods has become available. Such information on the content of vitamin B_6 and vitamin B_{12} for a limited number of foods was used to estimate the amount of these nutrients in the plans.

1/ Family Economics Review, October 1964. Agricultural Research Service, USDA.

2/ Recommended Dietary Allowances 1974, Eighth Edition, National Academy of Sciences-National Research Council, 1974.

3. Information on food eaten by men, women, and children of different ages on a nationwide basis has become available since 1964. USDA's 1965-66 survey of household food consumption provided information for the first time on the food intake of individuals in the household.[3/] It also provided the most recent detailed information on the quantities and money value of food used (purchased, home-produced, or received as gift or pay) by the total household.[4/] Data from this study were used to estimate the amounts of 17 groups of foods used to prepare meals and snacks for men, women, and children of different ages in households with low, moderate, and liberal food costs. These amounts of food groups made up the food consumption patterns used in developing the 1974 plans.

4. Shifts have occurred in food prices over the past 10 years. Prices for most foods have increased, but some have increased more than others. Several foods that are generally used in large amounts in the low-cost plan, such as dry beans and potatoes, have increased markedly in price. They are not, therefore, as economical relative to other foods as they were. To account for this, prices paid by survey families in 1965-66, updated to 1974 levels, were used in revising the plans.

5. Computerized techniques have been designed for developing food plans, as they have for many other nutrition and food service related problems. A quadratic programming model was used to find the combination of food groups (plan) that represents as little change from the food consumption pattern as required to meet the nutritional goals at a given cost. It is assumed in this model that conformity to existing food consumption patterns is one measure of palatability of a diet. Additional information about the model and the data used is presented in part II, page 10.

6. The amounts of foods suggested in the 1964 food plans for some sex-age categories were similar even though amounts of certain nutrients recommended for those categories were slightly different. To simplify the plans, such categories are combined in the 1974 plans. The 1964 plans were for 18 sex-age categories and for pregnant and nursing women; the 1974 plans are for 12 sex-age categories and for pregnant and nursing women.

7. Readymade bakery products were included with flour, cereal, and bread as one of the food groups for which amounts of foods were specified in the 1964 plans. Bakery products, more prominent in the marketplace now than they were in 1964, are not as economical as flour and cereal as sources of most of the nutrients they provide. In the 1974 plans, flour, cereal, bread, and other bakery products are included as four separate food groups.

3/ Food and Nutrient Intake of Individuals in the United States, Spring 1965, Household Food Consumption Survey 1965-66, Report No. 11, USDA-ARS, January, 1972.

4/ Food Consumption of Households by Money Value of Food and Quality of Diet, Household Food Consumption Survey 1965-66, Report No. 17, USDA-ARS, October 1972.

Food Groups in the 1974 Plans--Foods They Contain

Foods within a food group are similar to each other in nutritive value. In some groups--meat, poultry, and fish, for example--one food in the group might be used to replace another in a meal. Although each group is of special importance for one or more nutrients or as a source of food energy, several groups may provide appreciable amounts of the same nutrient. The cost of providing the nutrient may differ considerably among groups. For example, foods in the meat and bread groups provide iron; however a milligram of iron from the meat group costs much more than a milligram of iron from the bread group.

The food groups in the 1974 food plans, with the common foods included in each are shown below. Commercially processed foods and commercially prepared mixtures are included in the group containing the main ingredient (other than water).

Milk, cheese, ice cream: Milk--whole, low-fat, skim, buttermilk, flavored, dry, evaporated, condensed; cheese; cream; ice cream; ice milk; yoghurt.

Meat, poultry, fish: Beef, veal, lamb, pork (includes bacon and salt pork); variety meats such as liver, heart, and tongue; luncheon meats; poultry; fish; shellfish.

Eggs.

Dry beans and peas, nuts: Dry beans of all kinds, dry peas, lentils, soybeans and soya products, peanuts, peanut butter, tree nuts.

Potatoes: White potatoes.

Citrus fruits, tomatoes: Grapefruit, lemons, limes, oranges, tangerines, tomatoes.

Dark-green and deep-yellow vegetables: Broccoli, chard, collards, kale, spinach, other dark greens; carrots, pumpkin, sweetpotatoes, yellow winter squash.

Other vegetables, fruit: All vegetables and fruit not included in other groups, such as asparagus, beets, brussels sprouts, cabbage, cauliflower, celery, corn, cucumbers, green lima beans, snapbeans, lettuce, okra, onions, parsnips, peas, peppers, rutabagas, sauerkraut, summer squash, turnips. Apples, avocados, bananas, berries of all kinds, cherries, dates, figs, grapes, melons, peaches, pears, pineapple, plums, prunes, raisins, rhubarb.

Flour: Flour, meal, mixes for the preparation of bakery products.

Cereal: Cereals, including ready-to-eat cereals; rice, hominy, oats, noodles, macaroni, spaghetti.

Bread: Commercially prepared bread, rolls (not sweet), biscuits.

Bakery products: Commercially prepared crackers, cookies, cakes, pies, doughnuts, sweet rolls; mixtures that are mostly grains.

Fats, oils: Butter, margarine, mayonnaise, salad dressing, salad and cooking oils, shortening.

Sugars, sweets: Sugar, granulated, powdered, brown, maple; molasses; sirup; honey; jams; jellies; preserves; powdered and prepared desserts; candy.

Accessories: Coffee, tea, cocoa. Soft drinks, carbonated and uncarbonated fruit drinks, punches, ades, nectars. Baking powder, yeast, vinegar, artificial sweeteners, salt, condiments.

Food Plans Described

The low-cost plan and the moderate-cost plan, shown in Tables 1 and 2, provide diets consistent with food patterns that are typical of those of most groups of people in this country. Compared with the moderate-cost plan, the low-cost plan calls for smaller amounts of most foods, especially milk, cheese, and ice cream; meat, poultry, and fish; fruit and vegetables other than potatoes; and bakery products. It calls for larger amounts of cereal, flour, and bread. Users of the low-cost plan are expected to select, most of the time, the lower cost foods within food groups--ground beef rather than steak and bread rather than fancy rolls, for example. Plans for nutritious diets at costs considerably lower than the low-cost plan can be developed. One such plan is now being developed by the USDA.

The moderate-cost plan not only includes larger quantities of meat and vegetables and fruit than the low-cost plan, but allows for more frequent purchase of the higher priced cuts of meat and out-of-season foods. This plan allows for meals with more variety and less home preparation than does the low-cost plan. Greater discard of food beyond the normal discard of bone and other inedible parts of food is assumed in the moderate-cost than the low-cost plan.

The liberal plan allows for a greater variety of foods and for considerably more animal products, fruits, and vegetables than the moderate-cost plan. More expensive choices within the groups account for much of the greater cost of the liberal plan. Greater discard of edible food is assumed in the liberal than in the less costly plans.

A family of four (couple 20-54 years, children 6-8 and 9-11 years) following the plans would use these foods during the week. Groups of vegetables and fruits and of grain products in the plans are combined in this presentation.

	Unit	Low-cost	Moderate-cost	Liberal
Milk, cheese, ice cream	quart	16.0	19.2	20.7
Meat, poultry, fish	pound	12.4	15.8	18.9
Eggs	dozen	1.2	1.3	1.3
Dry beans and peas, nuts	pound	1.4	1.2	1.3
Vegetables, fruit	pound	33.3	39.2	45.3
Grain products	pound	17.1	16.4	16.9
Cost for plan, September 1974		$45.60	$57.10	$68.50

The food plans also include fats and oils, sugar and sweets, and accessories, such as coffee and other nonalcoholic beverages, leavening agents and seasonings (Tables 1-3).

In estimating the nutritive value and the cost of the plans it is assumed that families following the plans select the kinds and amounts of foods in each of the food groups that the survey households selected on the average. The average selections reported by survey families are believed to provide the most reliable basis for food guides such as these to be used nationwide. However, such selections are not useful in interpreting the plans to families because the selections include hundreds of foods--all of those used by any of the survey households. Furthermore, the average amounts of most foods used in a week are too small to be suitable for meal planning. Lists of commonly used foods for a family of four typical of those foods used in costing the plans are available on request from the Consumer and Food Economics Institute (see page 21).

Food Plans and Food Consumption Patterns

The food consumption pattern[5/] for a week for the family of four (total of patterns for man and woman 20-54 years and children 6-8 and 9-11 years) used as a basis for the three food plans are shown below:

	Unit	Low-cost	Moderate-cost	Liberal
Milk, cheese, ice cream	quart	15.8	18.6	20.0
Meat, poultry, fish	pound	16.1	18.2	20.8
Eggs	dozen	1.7	1.8	1.8
Dry beans and peas, nuts	pound	1.1	1.1	1.2
Vegetables, fruit	pound	34.3	39.5	45.2
Grain products	pound	14.2	14.6	15.2

5/ See page 11 for information on the derivation of food consumption patterns.

Foods in the consumption patterns at all three cost levels provided the RDA[6/] for some nutrients but not for others; therefore, adjustment to patterns was required in developing the plan. Foods in the patterns provided RDA for protein, vitamin A, thiamin, riboflavin, niacin, vitamin B_{12}, and ascorbic acid. The other nutrients for which the food patterns were evaluated and the sex-age categories with patterns that failed to meet the RDA are as follows:

Nutrient	Sex-age category
Calcium	Teenage girls; women; men 55 years and older
Iron	Infants; children 1 to 2 years; teenage girls; women, 20-54 years
Vitamin B_6 I/	Teenage girls; women; men 55 years and older
Magnesium I/	All 12 years and older

Fat in consumption patterns of older teenage boys, of men, and of women 20-54 years of age provided more than 40 percent of food energy--the upper limit for fat allowed in the plans. The number of eggs in the patterns for all persons over 9 years exceeded the limit of 4 per week set for the plans. Adjustments to consumption patterns at all three levels of cost involved the use of less meat, poultry, fish, and eggs and more dry beans and peas, nuts, and grain products. For example, the food consumption pattern at the moderate-cost level and the moderate-cost plan for a week for the family of four (couple 20-54 years, children 6-8 years and 9-11 years) is shown below:

	Unit	Consumption pattern	Plan
Milk, cheese, ice cream	quart	18.6	19.2
Meat, poultry, fish	pound	18.2	15.8
Eggs	dozen	1.8	1.3
Dry beans and peas, nuts	pound	1.1	1.2
Vegetables, fruit	pound	39.5	39.2
Grain products	pound	14.6	16.4

6/ RDA were increased by 10, 20, and 30 percent in evaluating food patterns for the low-cost, moderate-cost, and liberal plans, respectively, to allow for the nutrient content of discarded edible food.

I/ Evaluation based on rough estimate of content of food making up food consumption patterns. Content of this nutrient in many foods in the patterns is not known (see page).

The Nutritional Quality of the Food Plans

Nutritional goals for the plans are based on the 1974 RDA. The NAS-NRC states that the basis for the RDA is such that "even if a person habitually consumes less than the recommended amounts of some nutrients, his diet is not necessarily inadequate for those nutrients." (See footnote 2/.) The actual physiological requirement of most, but not necessarily all, individuals for a nutrient may be somewhat less than the RDA. Food plans developed to meet the RDA would be expected to provide generous amounts of nutrients for most, but not necessarily all, persons.

When nutritive values[8/] for average selections of foods within food groups are assumed, the plans provide the nutritional goals for food energy, protein, calcium, iron, vitamin A value, thiamin, riboflavin, niacin, and ascorbic acid; and fat provides no more than 40 percent of the food energy.

The iron enrichment level for bread and flour proposed by the Food and Drug Administration in 1973 was assumed in the development of the plans. If that level is not adopted, the plans for some sex-age categories will not provide the nutritional goal for iron. However, all plans provide iron in excess of the amount specified by the NAS-NRC as likely to be furnished by a balanced and varied diet--6 mg of iron/1000 kcal--when current enrichment levels are assumed. Iron-fortified cereal is recommended for infants and children 1 to 2 years of age.

The vitamin B_6, vitamin B_{12}, and magnesium content of many foods in the plans is not known. Nevertheless, a rough estimate was made of levels provided by the plans. Plans furnish more than the RDA for vitamin B_{12} but do not meet the RDA for vitamin B_6 and magnesium for several sex-age categories. Plans that meet the nutritional goals for vitamin B_6 and magnesium can be developed, but require excessively large amounts of vegetables, fruit, and cereal--two to three times as much as consumed by some sex-age categories in 1965-66. Such distortion of food consumption is not justified in view of the limited food composition data available for these two nutrients. Therefore, the goals used in developing the plans were adjusted to assure that the plans provide 80 percent or more of the RDA for vitamin B_6 and magnesium.

Phosphorus levels of foods in the plans were not calculated but are believed to be well above the RDA. If iodized salt is used, the RDA for iodine will be met.

Insufficient reliable information is available on the content in foods of the four other nutrients for which RDA are set--vitamin D, vitamin E, folacin, and zinc--to make reliable estimates of levels provided by the plans.

8/ See page 12 for information on nutritive values of foods used.

Allowances are not specified by the NAS-NRC for some dietary factors of adequate diets. An example is linoleic acid, an essential fatty acid found in large concentrations in many oils that come from plants. Notable exceptions are olive oil and coconut oil. Margarines, salad dressings, mayonnaise and cooking oils are usually made from one or more vegetable oils. Also, dietary fiber is necessary for the normal functioning of the intestinal tract. Good sources of fiber include whole-grain cereals, fruits, vegetables, and legumes, such as dried peas and beans.

1974 Food Plans and 1964 Food Plans

The 1974 plans differ from those developed in 1964 in several ways. Generally, all three 1974 plans contain considerably less eggs, potatoes, and dark-green and deep-yellow vegetables than the 1964 plans. In the development of the 1964 plans, amounts of eggs and dark-green vegetables consumed were increased greatly, especially to provide iron. In the 1974 plans, cereals, flour, and bread with iron added provide a larger share of iron. Amounts of potatoes and dark-green and deep-yellow vegetables in the 1974 plans, although smaller than amounts in earlier plans, are not smaller than those in the food consumption patterns.

The 1974 low-cost plan for most sex-age categories contains slightly more, and the moderate-cost and liberal plans slightly less, meat, poultry, and fish than the earlier plans. However, the more expensive plans contain appreciably more dry beans and peas and nuts than earlier plans. Dry beans, cereal, bread, and flour groups are important in all plans, especially as sources of iron, vitamin B_6, and magnesium.

The amounts of selected food groups in the 1964 and 1974 plans at low cost and moderate cost for a family of four (couple and children 6-8 and 9-11 years) for a week are as follows:

		Low-cost plan		Moderate-cost plan	
	Unit	1964	1974	1964	1974
Milk, cheese, ice cream	quart	16.5	16.0	17.5	19.2
Meat, poultry, fish	pound	11.5	12.4	17.2	15.8
Eggs	dozen	2.1	1.2	2.4	1.3
Dry beans and peas, nuts	pound	1.4	1.4	.9	1.2
Vegetables, fruit	pound	40.8	33.3	43.5	39.2
Grain products *	pound	12.5	11.5	11.5	10.3
Cost of plan, September 1974		$44.70	$45.60	$56.60	$57.10

* Weight in terms of cereal, flour and the flour in bakery products.

II. Development of the 1974 Food Plans

Model for Food Plan Development

A quadratic programing model was used in the development of the 1974 food plans.9/ It selected, for each sex-age category, the optimum plan--the amounts of 17 food groups that represented as little change from the amounts of the food groups used (food consumption pattern) as was necessary to meet specifications. Specifications were set for the nutrient content and cost of the total plan and for quantities for each of the food groups.

"Change" was measured as the sum, for the 17 food groups, of the weighted squared deviations from the amount of food groups in the consumption pattern. The weights were set to cause deviations to be minimized on the basis of the percentage change rather than change in pounds of food groups. The squaring of weighted deviations resulted in small changes in amounts of several food groups, rather than a large change in one group to meet a specification.

A published computer program10/ was adapted in conjunction with the development of the model. Food economists, nutritionists, and mathematicians selected and prepared input data, defined the specifications, derived the equations, adapted the computer program and evaluated the results of each trial run.

Data Used in Developing the Plans

Data required were as follows:

1. Food consumption patterns--amounts (pounds) of 17 food groups11/ used in preparing food for a week for each of 12 sex-age categories and for pregnant and nursing women (categories).

2. Nutritional value of food groups--amounts of food energy and 17 nutrients provided by a pound of each of the 17 food groups.

9/ Model developed by Joseph L. Balintfy, University of Massachusetts, in consultation with Brucy Gray, Judy P. Chassy and Betty Peterkin, Consumer and Food Economics Institute, Agricultural Research Service.

10/ Ravindran, H. Arunachalam, "A Computer Routine for Quadratic and Linear Programming Problems." Communications of the Association for Computing Machinery, Inc. 15 (9):818, September 1972.

11/ Accessories, the 15th group shown in Tables 1-3, was considered as three separate groups--coffee, tea, and cocoa; soft drinks, punches, and ades; and leavenings and seasonings--in developing the plans.

3. Price per pound of each of 17 food groups.

4. Nutritional goals--total amounts of food energy and 12 nutrients to be provided by the plans for each of the categories.

5. Maximum cost of the plan for each of the categories.

6. Limits on quantities of food groups in plans for each of the categories.

Food consumption patterns.--The 1965-66 Household Food Consumption survey data were used to estimate quantities of 17 food groups for the preparation of meals and snacks for persons in the sex-age categories. Households used for estimating these quantities for the three plans were selected by the money value of food they used per person in a week.

Households were first put in order by the money value of food they used per person. Those from the 26th to the 49th percentile (with food costs from $7.00 to $8.99 per person per week in 1965-66) were used as the basis for food consumption patterns for the low-cost plan; those from the 50th to the 76th percentile ($9.00 to $11.99 food costs) for the moderate-cost plan; and those from the 77th to the 92nd percentile ($12.00 to $15.99 food costs) for the liberal plan. Households with extremely high food costs were excluded. Detailed information on food consumption of these groups of households is presented in Household Food Consumption Survey 1965-66, Report No. 17. (See footnote 4/.)

For each of the three groups of survey households, the average cost of food used was slightly higher than the desired level of cost for the plan. The consumption pattern of such households represents a more costly way of eating--a way of eating that might be preferred if a little more money than the plan allows were available for food. Food plans based on these patterns reflect, insofar as possible, the preferences of households for a more expensive assortment of foods.

The share of food purchased for use by the survey households in the preparation of food for various family members is not known. But amounts were estimated by using information on the average amount of food eaten (intake) by individuals. (See footnote 3/.) To do this, average intakes of foods from the food groups for persons in the sex-age categories were weighted by the sex-age composition of the selected households to estimate the average intake per person in the households. The ratios of the intakes for the various sex-age categories to the estimated average intake per person in the selected households were then applied to the average amount of the food group used (in terms of weight as purchased) per person by the selected households to estimate the amount of the food group used for various sex-age categories.

Amounts of the 17 food groups for each sex-age category were then increased or decreased proportionately to provide the nutritional goal for food energy--RDA plus allowance for food discard (see page 12). Food energy provided by the food groups for a sex-age category may have differed from the goal for several reasons. For example, more or less food may have been eaten than was required to provide the RDA, or the discard of edible food due to plate waste, spoilage, and the like in the household may have been more or less than the amount allowed for in the plan. In adjusting amounts of food groups to provide the nutritional goal it was assumed that all food groups were equally affected by such differences. The adjusted amounts of food groups for a sex-age category make up the food consumption pattern for the category used as a basis for the plan.

Nutritive value of food groups.--Average nutritive values per pound of 17 food groups used by selected survey households were used in the model to estimate the nutritive value of various combinations of food groups. Values were estimated for food energy, protein, fat, total saturated fatty acids, linoleic acid, oleic acid, carbohydrate, calcium, iron, magnesium, vitamin A value, ascorbic acid, niacin, riboflavin, thiamin, vitamin B_6, and vitamin B_{12}. For certain items--fatty acids, magnesium, vitamin B_6, and vitamin B_{12}--estimates were based on values for only a limited number of foods in the food groups.

Nutritive values for the edible portion of food per pound of food as purchased, from "Composition of Foods...raw, processed, prepared," USDA, AH No. 8; "Pantothenic Acid, Vitamin B_6, and Vitamin B_{12} in Foods," USDA, HERR 36; and unpublished data, were the basis for the estimates. Values were adjusted, when necessary, for vitamin losses during cooking. For meat, discard of drippings and one-half of the separable fat were assumed. For bread and flour, enrichment levels for thiamin, riboflavin, and niacin adopted in 1974 and to become effective in January 1975 were assumed; and for iron, the levels proposed in 1973 were assumed.

Prices of food groups.--Prices of foods paid in 1965-66 by survey households selected for food consumption patterns (page 11) were updated by using the percentage change in prices of each of about 100 foods, from the time of the survey to 1974. (These foods are routinely priced in several major cities by the Bureau of Labor Statistics.) Updated survey prices were weighted by amounts of foods used by the selected households to derive prices per pound of the 17 food groups used in developing the plans.

Nutritional goals.--The 1974 Recommended Dietary Allowances provided the basis for the lower limit for food energy and nutrients in the plans: RDA for food energy, protein, calcium, iron, vitamin A value, thiamin, riboflavin, niacin, vitamin B_{12} and ascorbic acid; and 80 percent of the RDA for magnesium and vitamin B_6 for all sex-age categories (see page 8).

The lower limits for nutrients include an allowance above the RDA to cover the discard of edible food. Such allowance is necessary because the quantities of foods suggested in the plans represent food as it enters the

kitchen, some of which may not be eaten. The discard of inedible parts of food, such as peelings, bone, and excessive fat, and the losses of vitamins in cooking, is allowed for in the nutritive values used in evaluating the plans. However, there is little information about the amount of edible food discarded in households during preparation as plate waste, or because of spoilage. Many survey households, especially those with relatively high food costs, purchased foods in amounts considerably greater than required to provide their food energy needs. Appreciable discard of edible food was therefore indicated. To allow for a reasonable discard of edible food and not jeopardize the nutritional quality of the plans, the RDA for food energy and all nutrients were increased by 10 percent in defining the lower limits for the low-cost plan, by 20 percent for the moderate-cost plan, and by 30 percent for the liberal plan.

Upper limits for food energy of 15 percent, 25 percent, and 35 percent above the RDA respectively were used in development of the plans. Upper levels were not set for nutrients except fat, which was limited in all plans so that it provided no more than 40 percent of the food energy. This level of fat is lower than found in average diets in the U.S. but higher than the level (35 percent) recommended by the American Heart Association. In the 1974 edition of the Recommended Dietary Allowances the Heart Association recommendation is mentioned, but NAS-NRC does not specify a maximum level of fat in diets for the general population. No limit on cholesterol in the plans was imposed. However, eggs--a food containing considerable cholesterol--were limited to 4 per person per week.

Maximum cost of food plans for sex-age categories.--A maximum cost for each sex-age category was predetermined to help assure that (1) costs would conform to the general cost level (per capita cost) desired for the plan and (2) there would be an equitable distribution of money for food among sex-age categories.

The general cost levels of the three plans were set to approximate updated food costs of survey households in the second, third, and fourth quartiles on a distribution of households by money value of food per person per week. Food costs of households were adjusted to allow for the purchase of 10, 20, and 30 percent above the cost of food needed to provide the RDA for food energy. The cost allowance for discard of edible food is therefore consistent with allowances for discard in the nutritional goals and the food consumption patterns.

To determine equitable costs for the sex-age categories, differences among categories both in the basic cost of providing the nutritional goals and in the cost of existing food consumption patterns were considered. Such differences were approximated from the costs of two preplans--combinations of food groups in the pattern changed as little as was required to meet the nutritional goals--one at least cost and the other with no limit on cost. Certain limits on quantities of food groups, as described below, were imposed. These preplans and their costs were determined for each sex-age category by using the quadratic programing model. Equitable costs were determined for

the categories by subtracting a constant proportion of the difference between costs for the two preplans from the cost of the more expensive preplan. The proportion used was set to result in the per capita cost for the plan as defined in the preceding paragraph.

Limits on quantities of food groups.--Upper limits of twice the amount of food groups in the food consumption pattern and lower limits of one-half the amount were imposed, except for the fat, sugar and soft drink groups, for which no more than the amount in the pattern was allowed. (The limits of twice and of one-half the amounts of food groups were not found to be binding in developing the plans.)

Upper and lower limits on the ratio of the amount of flour to the amount of leavening agents and seasonings were imposed. Certain other limits on quantities of food groups were investigated but not used in this food plan revision.

Food Plan Development--A Continuing Project

The maintenance of the USDA food plans--their development, their interpretation through publications for leaders and consumers, and the periodic estimates of their costs--is an ongoing project in the Consumer and Food Economics Institute. The plans are evaluated, and revised as required, when new information on food consumption, food prices, food composition and nutritional needs becomes available. The 1974 plans were developed by using the most recent, complete, and reliable information available; however, such information has limitations.

Current food consumption in U.S. households may be somewhat different than indicated by the 1965-66 survey data. However, USDA's annual estimates of the disappearance of food (national food supply) and Supermarketing magazine's annual study of consumer expenditures in grocery stores show no dramatic changes since 1965. These studies, though, provide information only for the country as a whole, not for households at different economic levels.

Averages--average amounts of foods consumed and average prices paid by groups of selected households--were used in developing the 1974 plans. More information on variation and factors affecting variation in food consumption and food prices among households and variation in food patterns of individuals in households of different sizes would be useful. Such information will be provided by a proposed nationwide study of food consumption. With the expanded data from the new study, new methods for developing and costing the plans can be explored.

More complete composition data on a wider variety of foods will be forthcoming from the Nutrient Data Bank--a repository for food composition data being developed in the Consumer and Food Economics Institute. This additional information will make possible a more complete assessment of the nutritional quality of foods in the plans.

III. Estimated Costs for the Food Plans

Costs of foods in the food plans are estimated each month. (See page 22). Average prices paid for almost 2000 different foods by survey households in 1965-66 are used as a basis for the estimates. These prices reflect the assortment of container sizes and brands, the differences in quality of food selected, and the price levels of the store of purchase for families who use food at different levels of cost. Procedures used in updating costs of the plans with these prices are as follows:

1. Prices paid by selected survey households are updated by using the percentage change in prices of a list of about 100 carefully defined foods from the time of the survey to the month of the estimate. Prices for these foods are collected routinely by the Bureau of Labor Statistics (BLS) from a representative sample of stores in selected cities across the country.

For example, if survey households selected as a basis for the low-cost plan paid an average price of 60 cents a pound for ground beef in 1965-66 and the price for ground beef collected by BLS in December 1974 is 50 percent higher than the price collected by BLS in 1965-66, a price of 90 cents (60¢ + 50% of 60¢) would be used for ground beef in figuring the cost of the low-cost plan in December 1974. Prices of certain other low-cost cuts of beef that were used by survey families, but are not priced regularly by BLS, would be increased by 50 percent also. The percentage increase in the BLS price for other beef cuts would be used to update prices paid by survey households for the numerous remaining cuts of beef they used.

2. The updated prices for foods in each food group for each of the three plans are weighted by the average amounts of foods used by the survey households to derive a price per unit--pound, quart, or dozen.

3. The prices per unit are then multiplied by the number of units of the food groups in the plans for the different sex-age categories (Tables 1-3) to determine the cost of foods from each food group.

4. Costs for the food groups for each category are totaled. These totals, rounded to the nearest 10 cents, are released as the cost of food at home for a week. Unrounded weekly costs are multiplied by 4.333, then rounded to the nearest 10 cents to estimate the cost for the month.

The September 1974 costs for the 1974 food plans are shown in Table 4; comparable costs for the 1964 plans are shown in Table 5. The costs of the three 1974 plans for many families are similar to costs for the earlier plans. However, 1974 plans for preschool children and teenagers account for a smaller part of the family food budget, and plans for women 55 years and over and for men 20 years and over, for a larger share, than did the earlier plans.

IV. The Food Plans and Family Budgeting 12/

The USDA food plans (Tables 1-3) and their costs (Table 4) can be used as guides in working out food budgets for families. The costs for the food plans are guides to how much money a family might reasonably spend for food. The food plans show the kinds and amounts of food that the family might purchase, or obtain in other ways, to provide well-balanced meals and snacks for family members.

Selecting the Plan

The family may select the plan--low-cost, moderate-cost, or liberal--to follow in one of these two ways:

1. Select the plan that costs the amount that other families, similar in size and income, spend for food on the average. The food plans that could be followed by using the money that families of different sizes and incomes spend, on the average, are shown in Table 6. To select the plan, locate the column that corresponds to the number of persons in the family. Then move down this column to the point opposite the family income after Federal and State income taxes are deducted. Select the plan shown there.

2. Select the plan that costs about the amount the family currently budgets (or would like to budget) for food. To find this plan, figure the costs for the three plans for September for the family, using the costs in Table 4 and the procedures below. Then compare the costs for the plans with the amount the family budgets for food to find which plan best fits the budget.

The Cost of the Plan

Use Table 4 to figure the cost of following the food plan for the family:

1. Find the weekly cost for each person eating from family food supplies. List the amount opposite the age and sex of each person as follows:

- For family members who eat all meals at home (or carry meals from home, such as lunches or picnics), use the weekly cost given in Table 4.

- For family members who eat some meals out, deduct 5 percent for each meal not eaten at home from the cost in the table. For example, if a child eats lunch out five times a week, subtract 25 percent, or one-fourth, of the cost shown for the child's age group.

12/ For additional information on food money management, see Your Money's Worth in Foods, USDA, HG-183. Single copies are available free from the Office of Communication, U.S. Department of Agriculture, Washington, D.C. 20250.

For guests and others who occasionally eat with the family, list 5 percent of the cost in the table for the proper age group for each meal. Suppose grandmother eats her midday and evening meals with the family every Sunday. Add 10 percent, or one-tenth, of the amount for women of her age.

2. Next, total the costs listed and adjust the total if there are more or fewer than four persons usually eating at the family table. Costs in Table 4 are for individuals in families of four persons. Adjustment is necessary because large families tend to buy and use foods more economically than small families. If the family has--

1 person.....add 20 percent
2 persons.....add 10 percent
3 persons.....add 5 percent
4 persons.....use as is
5 persons.....subtract 5 percent
6 or more persons.....subtract 10 percent

Comparing the Cost of the Plan with Family Food Expenditures

Compare the cost of the plan for the family with the amount of money actually spent for food eaten at home during a week. Do not count the amount spent at the grocery store for nonfood items, such as soap, cigarettes, paper goods, and pet foods. The cost estimates do not include such items, which account for over 20 cents of every dollar spent in supermarkets.

If the amount spent is about the same as the cost of the foods in the plan, it is sufficient to provide nutritious meals. If it is considerably more, the family probably could use some help in holding food costs down. If the amount is a great deal less, the family may not be getting the assortment of foods needed.

Necessarily, the costs of the USDA food plans are only rough guides to spending. The amount a family spends may be more or less, depending on:

- what foods are selected
- where the family buys its food
- how much food is prepared at home
- whether some of the food is produced at home
- how carefully the family plans and buys
- the importance the family places on food in relation to other family needs.

Spending the amount that the foods in the plan cost does not automatically lead to well-balanced meals. A diet that includes a variety of different kinds of foods is needed to supply the nutrients for growth and good health. Following the selected food plan is one way to help assure that family members get the nutrients they need. Amounts of foods to buy to follow the plan can be estimated for the family and compared with amounts the family buys to see what, if any, changes are needed to follow the plan.

The Food Plan for the Family

Use Table 1, 2, or 3, which shows the amounts of food groups in the plans for men, women, and children of different ages, to figure the amount of food in the plan for the family.

1. List the amounts of food groups opposite the sex and age of each person eating from the family food supply as follows:

- For family members who eat all meals at home (or carry meals from home), use the amount given in the table.

- For family members who eat some snacks or meals out regularly, deductions should be made--

  --from the food groups containing the foods eaten away, if possible. For example, if a family member buys a doughnut and a half-pint of milk at work five mornings a week, deduct from the bakery products group the weight of five doughnuts and from the milk group 1.25 quarts of milk.

  --from all food groups, if whole meals that include foods from all or most food groups are eaten away. Deduct 5 percent of the suggested amount of each food group for an average-size meal eaten away. Deduct more or less than 5 percent if the meal is unusually large or small.

- For guests and others who occasionally eat with the family, add 5 percent of the amount of each food group suggested for the proper age group for each meal.

2. Next, total for all persons listed, the amounts of food groups to find the amount of food suggested in the plan for the family for a week.

Food Used by the Family

Total the amount of food purchased (or brought into the kitchen from the farm or garden) that is used to prepare meals and snacks for the family for a week. Do this separately for the food groups in the food plan.

Before amounts of various foods in a group can be totaled, they must be converted to the amounts of a common unit--pounds and decimal parts of a pound, for example. Most produce and meat is sold by the pound; many processed foods show the net weight on the label in ounces. To convert ounces to decimal parts of a pound, use the table below:

ounces	pound	ounces	pound
1	.06	9	.56
2	.12	10	.62
3	.19	11	.69
4	.25	12	.75
5	.31	13	.81
6	.38	14	.88
7	.44	15	.94
8	.50	16	1.00

Milk, cheese, ice cream.--Total the amounts of fluid milk and beverages made from dry or evaporated milk used. Add milk products, counting as equal to one quart of milk: 6 ounces of natural or processed cheese, 2-1/2 pounds of cottage cheese; 3 pints of ice cream or ice milk.

Meat, poultry, fish.--Total the weight in pounds of all meat, poultry, and fish used. Add the approximate weight of the meat, poultry, or fish contained in commercially prepared mixtures. For example, if about one-fourth of a 1-pound meat pie appears to be meat, add .25 pounds of meat to the meat group.

Dry beans and peas, nuts.--Add the weight of peanut butter, dry mature beans, peas, and lentils, and shelled nuts used. If processed dry legumes are used, such as canned pork and beans, blackeyed peas, butterbeans, and the like, add only .33 pounds for every pound used.

Vegetables and fruit.--These groups--dark-green and deep-yellow vegetables, citrus fruit and tomatoes, potatoes, and other vegetables and fruit--include items purchased raw, canned, frozen, and dried. Groups, except potatoes, include juices also. Total the weight of the foods in these groups as brought into the kitchen with these exceptions:

1. For frozen concentrated juices, add the weight of the reconstituted juice, or the weight on the can times 4.

2. For dehydrated potatoes, add the weight of an equal amount of fresh potatoes, or the weight on the package times 7.

Add the approximate weight of vegetable or fruit in canned or frozen mixtures used.

Flour, cereal, bread, bakery products, fats and oils, sugar and sweets, accessories.--Total the amounts of these foods by their weight. Include only the amounts used during the week.

Comparing the Food Used with the Food Plan

If the amounts of groups of foods used in the week are similar to those in the selected plan, the family probably has a good diet. However, the plan is only one of many ways foods can be combined to get a good diet. Meals are not necessarily poor if amounts of foods used are not exactly as suggested.

The amount of food purchased may differ from that shown in the plan because of the form in which foods are purchased. For example, the amounts of vegetables and fruits in the plan assume that fresh, canned, frozen, and dried items are purchased in proportions typical of average consumption. If the family uses fresh vegetables and fruit almost exclusively during certain times of the year, the amounts used should exceed the amount in the plan by about 10 percent to allow for the greater amount of refuse. If on the other hand, frozen and canned fruits and vegetables are used exclusively, amounts used may be about 10 percent below amounts suggested. If during a given week, most cuts of meat used have a high percentage of bone and fat, such as spareribs, shank, chicken wings, and bacon, the quantity used should be as much as a third higher than the plan suggests. However, the plan as shown is a suitable guide if, as is usual for most families in most weeks of the year, some fresh and canned and some frozen vegetables and fruit are used and the meats selected include some bony and some meaty pieces.

If more than the suggested amounts of dark-green and deep-yellow vegetables are purchased, a corresponding decrease in other vegetables and fruit can be made. Amounts of the "other" group, however, cannot be substituted for the dark-green and deep-yellow without reducing the amount of certain nutrients in the diet.

Food needs differ because of the size and activity of persons. Slightly more or less than the amounts of foods in the plan may be needed to satisfy appetites and maintain desirable weight for some family members. For example, amounts of fats and oils, sugar and sweets, and certain accessories, such as soft drinks, suggested in the plans could be reduced somewhat to lower calories without jeopardizing the nutritional quality of the diet.

Large differences between food used by the family and that in the plan may show up weaknesses in the diet.

Nutritive value of diet.--If much less milk is used than the plan calls for, some members of the family are likely to get less calcium and possibly less of the B-vitamin, riboflavin, than is recommended. If much less vegetables and fruit are used, diets may be short in vitamins A and C. The use of smaller amounts of cereal products than are called for in the plan may result in shortages of certain B-vitamins and of iron.

Variety in meals.--The plans are designed to offer considerable variety in meals. If the family skimps on some food groups--such as vegetables and fruit--and fills up on others--cereals and bread, for example, meals may be monotonous, as well as being short in some nutrients.

Food waste.--Use of much more food than called for in the plan probably indicates overeating or food waste. Excessive waste may occur in the preparation of food or as unused leftovers. Buying too much of a perishable food or buying food of poor quality may result in waste too.

Excessive cost.--Waste results in unnecessarily high food cost. Also, if large amounts of the more expensive foods--meats, for example--are used, costs will be higher than estimated for the plan.

Selecting Foods Within Food Groups

Appetizing meals can be prepared by using any of the three plans. However, greater variety, including more of the expensive foods, is possible in the liberal plan than in the less expensive plans. In each plan some expensive and some inexpensive foods can be selected, as is typical of buying practices of most families, regardless of the amount they spend for food. The average prices for food groups shown below, those used in figuring the cost of the three food plans for September 1974 (Table 4), may serve as a guide.

		Low-Cost	Moderate-Cost	Liberal
Milk, cheese, ice cream (milk equivalent)	qt	$0.44	$0.47	$0.50
Meat, poultry, fish	lb	1.09	1.17	1.26
Eggs	dz	.75	.76	.78
Dry beans and peas, nuts (dry shelled weight)	lb	.83	.91	1.13
Dark-green and deep-yellow vegetables	lb	.28	.30	.31
Citrus fruit, tomatoes	lb	.23	.24	.24
Potatoes	lb	.17	.18	.20
Other vegetables, fruit	lb	.28	.30	.31
Cereal	lb	.50	.52	.54
Flour	lb	.28	.32	.32
Bread	lb	.40	.44	.46
Other bakery products	lb	.67	.72	.78
Fats, oils	lb	.66	.70	.73
Sugar, sweets	lb	.57	.62	.66

Lists of foods for a month for a family of four, typical of those used in costing the plans, are available on request from the Consumer and Food Economics Institute, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Md. 20782. These lists, based on average amounts of food used by survey families, are not intended as a market list for any family to use in shopping for food.

How Cost Estimates and Additional Information About the Food Plans Can Be Obtained

The cost of food at home for the food plans is released at the beginning of the second month following the month of the estimate. For example, October estimates are released the first week of December.

Costs are released in three ways: (1) Food and Home Notes, a weekly newsletter prepared primarily for the news media by the Office of Communication of the U.S. Department of Agriculture, carries the costs each month. (2) Quarterly issues of Family Economics Review published by the Consumer and Food Economics Institute, Agricultural Research Service, U.S. Department of Agriculture, present the cost for a recent month. (3) The Consumer and Food Economics Institute mails the costs for the 3rd month of each quarter to a list of persons requesting them shortly after the costs are estimated.

Additional information about the new USDA family food plans will be presented or announced in future issues of Family Economics Review.

Table 1.--Low-cost food plan: Amounts of food for a week 1/

Family member	Milk, cheese, ice cream 2/	Meat, poultry, fish 3/	Eggs	Dry beans and peas, nuts 4/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 5/
	Qt	Lb	No.	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year-----	5.70	0.56	2.1	0.15	0.35	0.42	0.06	3.43	6/ 0.71	0.02	0.06	0.05	0.05	0.18	0.06
1-2 years-----	3.57	1.26	3.6	.16	.23	1.01	.60	2.88	6/ .99	.27	.76	.33	.12	.36	.68
3-5 years-----	3.91	1.52	2.7	.25	.25	1.20	.85	2.95	.90	.30	.91	.57	.38	.71	1.02
6-8 years-----	4.74	2.03	2.9	.39	.31	1.58	1.10	3.67	1.11	.45	1.27	.84	.52	.90	1.43
9-11 years----	5.46	2.57	3.9	.44	.38	2.13	1.41	4.81	1.24	.62	1.65	1.20	.61	1.15	1.89
Male:															
12-14 years---	5.74	2.98	4.0	.56	.40	1.99	1.50	3.90	1.15	.67	1.88	1.25	.77	1.15	2.61
15-19 years---	5.49	3.74	4.0	.34	.39	2.20	1.87	4.50	.90	.75	2.10	1.55	1.05	1.04	3.09
20-54 years---	2.74	4.56	4.0	.33	.48	2.32	1.87	4.81	.93	.71	2.10	1.47	.91	.81	2.11
55 years and over-------	2.61	3.63	4.0	.21	.61	2.38	1.72	4.92	1.02	.62	1.73	1.23	.77	.90	1.16
Female:															
12-19 years---	5.63	2.55	4.0	.24	.46	2.17	1.17	4.57	.75	.63	1.44	1.05	.53	.88	2.44
20-54 years---	3.02	3.21	4.0	.19	.55	2.34	1.40	4.17	.71	.55	1.31	.94	.59	.72	2.13
55 years and over-------	3.01	2.45	4.0	.15	.62	2.54	1.22	4.57	.97	.58	1.24	.86	.38	.64	1.11
Pregnant------	5.25	3.68	4.0	.20	.67	2.80	1.65	4.99	.95	.66	1.52	1.06	.55	.78	2.56
Nursing-------	5.25	4.16	4.0	.26	.66	2.99	1.67	5.33	.78	.61	1.55	1.16	.76	.91	2.70

1/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about one-tenth of the edible food as plate waste, spoilage, etc. Amounts of foods are shown to two decimal places to allow for greater accuracy, especially in estimating rations for large groups of people and for long periods of time. For general use, amounts of food groups for a family may be rounded to the nearest tenth or quarter of a pound.

2/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz.; cottage cheese, 2-1/2 lbs.; ice cream, 1-1/2 quarts.

3/ Bacon and salt pork should not exceed 1/3 pound for each 5 pounds of this group.

4/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 pound of canned dry beans--pork and beans, kidney beans, etc.--as .33 pound.

5/ Includes coffee, tea, cocoa, punches, ades, soft drinks, leavenings, and seasonings. The use of iodized salt is recommended.

6/ Cereal fortified with iron is recommended.

Table 2.--Moderate-cost food plan: Amounts of food for a week 1/

Family member	Milk, cheese, ice cream 2/	Meat, poultry, fish 3/	Eggs	Dry beans and peas, nuts 4/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Acces-sories 5/
	Qt	Lb	No.	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year-----	6.46	0.80	2.2	0.13	0.41	0.49	0.06	3.98	6/ 0.64	0.02	0.06	0.05	0.05	0.19	0.08
1-2 years-----	4.04	1.69	4.0	.15	.29	1.24	.59	3.44	6/ 1.03	.26	.81	.33	.12	.26	.79
3-5 years-----	4.74	1.88	3.0	.22	.30	1.46	.85	3.51	.74	.27	.82	.73	.41	.81	1.42
6-8 years-----	5.79	2.60	3.3	.34	.37	1.94	1.17	4.39	.84	.39	1.14	1.11	.56	1.03	1.97
9-11 years----	6.68	3.31	4.0	.38	.45	2.61	1.40	5.76	1.03	.51	1.47	1.51	.66	1.31	2.63
Male:															
12-14 years---	7.02	3.77	4.0	.48	.48	2.44	1.52	4.66	.94	.56	1.69	1.54	.85	1.34	3.65
15-19 years---	6.65	4.65	4.0	.29	.47	2.73	2.00	5.45	.80	.67	1.98	1.82	1.05	1.15	4.41
20-54 years---	3.38	5.73	4.0	.29	.59	2.92	1.94	5.93	.76	.65	1.97	1.65	.95	.96	2.95
55 years and over-------	2.97	4.64	4.0	.19	.70	2.91	1.69	5.88	.89	.53	1.58	1.45	.87	1.05	1.50
Female:															
12-19 years---	6.22	3.32	4.0	.24	.53	2.62	1.21	5.38	.68	.56	1.34	1.22	.56	.97	3.36
20-54 years---	3.35	4.12	4.0	.19	.62	2.84	1.35	4.94	.54	.49	1.28	1.08	.65	.81	2.89
55 years and over-------	3.35	3.21	4.0	.14	.72	3.09	1.17	5.56	.81	.52	1.20	.98	.45	.73	1.39
Pregnant------	5.44	4.57	4.0	.25	.91	3.52	1.60	6.13	.73	.83	1.77	1.28	.46	.85	3.50
Nursing-------	5.31	5.01	4.0	.26	.91	3.76	1.73	6.52	.74	.81	1.84	1.42	.69	1.00	3.79

1/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about one-sixth of the edible food as plate waste, spoilage, etc. Amounts of foods are shown to two decimal places to allow for greater accuracy, especially in estimating rations for large groups of people and for long periods of time. For general use, amounts of food groups for a family may be rounded to the nearest tenth or quarter of a pound.

2/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz.; cottage cheese, 2-1/2 lbs.; ice cream, 1-1/2 quarts.

3/ Bacon and salt pork should not exceed 1/3 pound for each 5 pounds of this group.

4/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 pound of canned dry beans--pork and beans, kidney beans, etc.--as .33 pound.

5/ Includes coffee, tea, cocoa, punches, ades, soft drinks, leavenings, and seasonings. The use of iodized salt is recommended.

6/ Cereal fortified with iron is recommended.

Table 3.--Liberal food plan: Amounts of food for a week 1/

Family member	Milk, cheese, ice cream 2/	Meat, poultry, fish 3/	Eggs	Dry beans and peas, nuts 4/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Acces-sories 5/
	Qt	Lb	No.	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year	6.94	0.97	2.3	0.14	0.43	0.60	0.06	4.71	6/ 0.64	0.02	0.05	0.06	0.05	0.20	0.09
1-2 years	4.26	2.07	4.0	.17	.31	1.50	.59	4.10	6/ 1.07	.28	.82	.35	.13	.27	.95
3-5 years	5.08	2.35	3.1	.23	.32	1.77	.85	4.18	.76	.27	.79	.78	.45	.85	1.74
6-8 years	6.25	3.18	3.4	.36	.40	2.35	1.18	5.21	.85	.39	1.08	1.23	.60	1.08	2.41
9-11 years	7.21	4.04	4.0	.39	.48	3.15	1.41	6.83	1.04	.51	1.39	1.67	.71	1.38	3.21
Male:															
12-14 years	7.57	4.57	4.0	.50	.51	2.94	1.52	5.52	.95	.56	1.60	1.71	.92	1.40	4.47
15-19 years	7.18	5.59	4.0	.31	.50	3.29	2.01	6.45	.84	.69	1.92	2.05	1.07	1.20	5.36
20-54 years	3.64	6.83	4.0	.32	.62	3.51	1.95	6.99	.79	.66	1.91	1.86	.95	1.00	3.54
55 years and over	3.24	5.54	4.0	.19	.76	3.52	1.68	6.97	.89	.54	1.49	1.57	.94	1.09	1.82
Female:															
12-19 years	6.72	3.97	4.0	.25	.56	3.15	1.21	6.34	.71	.59	1.31	1.35	.54	.98	4.09
20-54 years	3.62	4.86	4.0	.20	.66	3.41	1.35	5.81	.56	.51	1.24	1.22	.66	.84	3.47
55 years and over	3.65	3.79	4.0	.15	.76	3.71	1.14	6.42	.74	.54	1.17	1.12	.48	.77	1.66
Pregnant	5.91	5.43	4.0	.26	.96	4.22	1.57	7.17	.70	.87	1.70	1.45	.46	.87	4.20
Nursing	5.76	5.97	4.0	.28	.97	4.51	1.72	7.66	.75	.84	1.76	1.58	.68	1.02	4.52

1/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about one-fourth of the edible food as plate waste, spoilage, etc. Amounts of foods are shown to two decimal places to allow for greater accuracy, especially in estimating rations for large groups of people and for long periods of time. For general use, amounts of food groups for a family may be rounded to the nearest tenth or quarter of a pound.

2/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz.; cottage cheese, 2-1/2 lbs.; ice cream, 1-1/2 quarts.

3/ Bacon and salt pork should not exceed 1/3 pound for each 5 pounds of this group.

4/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 pound of canned dry beans--pork and beans, kidney beans, etc.--as .33 pound.

5/ Includes coffee, tea, cocoa, punches, ades, soft drinks, leavenings, and seasonings. The use of iodized salt is recommended.

6/ Cereal fortified with iron is recommended.

Table 4.--Cost of Food at Home 1/ Estimated for 1974 Food Plans at Three Cost Levels, September 1974, U.S. Average

Sex-age groups	Cost for 1 week			Cost for 1 month		
	Low-cost plan	Moderate-cost plan	Liberal plan	Low-cost plan	Moderate-cost plan	Liberal plan
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
FAMILIES						
Family of 2, 20-54 yrs. 2/..	26.70	33.60	40.30	115.90	145.10	174.10
Family of 2, 55 or more 2/..	23.60	29.40	35.00	102.60	127.20	151.80
Family of 4, preschool children 3/.....	37.70	47.00	56.30	163.40	203.40	243.90
Family of 4, school children 4/.....	45.60	57.10	68.50	197.80	247.20	296.60
INDIVIDUALS 5/						
Child:						
7 months to 1 year.....	5.10	6.30	7.40	22.20	27.10	32.10
1-2 years.....	6.10	7.50	8.90	26.40	32.50	38.70
3-5 years.....	7.30	9.00	10.80	31.60	39.00	46.90
6-8 years.....	9.50	11.80	14.20	41.10	51.20	61.50
9-11 years.....	11.80	14.80	17.70	51.30	64.10	76.80
Male:						
12-14 years.....	12.70	15.70	18.90	54.80	68.20	81.70
15-19 years.....	13.90	17.40	20.90	60.40	75.30	90.40
20-54 years.....	13.50	17.00	20.50	58.50	73.60	88.60
55 years and over.....	11.80	14.70	17.60	51.30	63.70	76.40
Female:						
12-19 years.....	11.20	13.90	16.50	48.70	60.10	71.70
20-54 years.....	10.80	13.50	16.10	46.90	58.30	69.70
55 years and over..	9.70	12.00	14.20	42.00	51.90	61.60
Pregnant.....	13.40	16.40	19.60	57.90	71.20	84.80
Nursing.....	14.20	17.60	21.00	61.60	76.30	90.90

1/ These estimates were computed from quantities in food plans published in Family Economics Review, Winter 1975. The costs of the food plans were first estimated by using the average price per pound of each food group paid by urban survey families at three selected food cost levels in 1965-66. These prices were adjusted to current levels by use of Retail Food Prices by Cities released periodically by the Bureau of Labor Statistics.

2/ Ten percent added for family size adjustment.

3/ Man and woman, 20-54 years; children, 1-2 and 3-5 years.

4/ Man and woman, 20-54; children, 6-8 and 9-11 years.

5/ The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person--add 20 percent; 2-person--add 10 percent; 3-person--add 5 percent; 5-person--subtract 5 percent; 6-or-more-person--subtract 10 percent.

Table 5.--Cost of Food at Home 1/ Estimated for 1964 Food Plans at Three Cost Levels, September 1974, U.S. Average

Sex-age groups 2/	Cost for 1 week			Cost for 1 month		
	Low-cost plan	Moderate-cost plan	Liberal plan	Low-cost plan	Moderate-cost plan	Liberal plan
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
FAMILIES						
Family of 2, 20-35 years 3/	26.50	33.50	40.80	115.30	145.40	176.70
Family of 2, 55-75 years 3/	21.60	27.80	33.10	93.50	120.10	143.10
Family of 4, preschool children 4/	38.20	48.30	58.30	166.00	209.40	252.60
Family of 4, school children 5/	44.70	56.60	68.90	193.90	245.50	298.30
INDIVIDUALS 6/						
Children, under 1 year	5.00	6.20	6.90	21.50	26.90	29.90
1-3 years	6.40	8.00	9.50	27.80	34.70	41.30
3-6 years	7.70	9.80	11.70	33.40	42.50	50.70
6-9 years	9.50	12.00	14.90	41.10	52.20	64.50
Girls, 9-12 years	10.80	13.80	16.00	46.60	59.70	69.30
12-15 years	11.80	15.30	18.30	51.30	66.10	79.20
15-20 years	12.10	15.10	17.80	52.30	65.50	77.10
Boys, 9-12 years	11.10	14.10	16.90	48.00	61.10	73.20
12-15 years	13.00	16.90	20.00	56.20	73.30	86.60
15-20 years	15.00	18.90	22.60	64.90	82.00	97.90
Women, 20-35 years	11.10	14.10	16.80	48.30	61.00	72.80
35-55 years	10.70	13.50	16.10	46.30	58.60	69.80
55-75 years	9.00	11.50	13.70	38.90	50.00	59.20
75 years and over	8.10	10.30	12.40	35.30	44.40	53.80
Pregnant	13.10	16.30	19.10	56.80	70.60	82.90
Nursing	15.30	18.80	22.00	66.10	81.60	95.10
Men, 20-35 years	13.00	16.40	20.30	56.50	71.20	87.80
35-55 years	12.10	15.20	18.40	52.30	66.00	79.80
55-75 years	10.60	13.70	16.40	46.10	59.20	70.90
75 years and over	9.90	13.10	15.70	42.90	56.80	68.00

1/ These estimates were computed from quantities in food plans published in Family Economics Review, October 1964. The costs of the food plans were first estimated by using the average price per pound of each food group paid by urban survey families at three selected income levels in 1965. These prices were adjusted to current levels by use of Retail Food Prices by Cities released periodically by the Bureau of Labor Statistics.

2/ Age groups include the persons of the first age listed up to but not including those of the second age listed.

3/ Ten percent added for family size adjustment.

4/ Man and woman, 20-35 years; children, 1-3 and 3-6 years.

5/ Man and woman, 20-35; child, 6-9 and boy 9-12 years.

6/ The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person--add 20 percent; 2-person--add 10 percent; 3-person--add 5 percent; 5-person--subtract 5 percent; 6-or-more-person--subtract 10 percent.

Table 6.--Food plans that families of different sizes and incomes can usually afford, 1974

Family income (after taxes)	2-person family	3-person family	4-person family	5-person family	6-person family
$2,000 to $4,000	Low-cost	1/	1/	1/	1/
$4,000 to $6,000	Moderate-cost	Low-cost	1/	1/	1/
$6,000 to $8,000	Moderate-cost or liberal	Low-cost or moderate-cost	Low-cost	Low-cost	1/
$8,000 to $10,000	Liberal	Moderate-cost	Low-cost or moderate-cost	Low-cost	Low-cost
$10,000 to $15,000	Liberal	Liberal	Moderate-cost	Moderate-cost	Low-cost or moderate-cost
$15,000 and over	Liberal	Liberal	Liberal	Moderate-cost or liberal	Moderate-cost or liberal

1/ Most families of this size and income will require a plan that is less costly than the low-cost plan. One such plan is now being developed by USDA.

Source: Data from Survey of Consumer Expenditures, 1960-61, U.S. Department of Labor, updated to 1974 levels.

PART B

THE THRIFTY FOOD PLAN

September 1975

Consumer and Food Economics Institute
Agricultural Research Service
U.S. Department of Agriculture
Hyattsville, Maryland 20782

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A new food plan, the thrifty food plan, has been developed by the Agricultural Research Service (ARS). This plan has been proposed as a basis for setting the coupon allotment for the Food Stamp Program effective in January 1976 by the Food and Nutrition Service (FNS), the agency that administers the program. The thrifty plan will be used by ARS and FNS in the preparation of guidance materials for program participants and others who wish to economize on food. The thrifty food plan, which replaces the economy food plan, is the least costly of four food plans developed during the past year by ARS. 1/

The thrifty plan is made up of foods of different types (food groups) that families might buy, or obtain from other sources, to provide nutritious meals and snacks for family members. In the plan, amounts of food are suggested for men, women, and children of different ages (Table 1). A plan for any family can be determined by totaling amounts of foods suggested for persons of the sex and age of family members.

Families following the plan may choose from the food groups those economical foods they enjoy eating. When ARS estimates the cost for the plan (Table 2), the makeup of the food groups is based on the average amounts of foods used by survey households with relatively low food costs. A food list for a family of four for a month (Table 3) illustrates the kinds and amounts of foods used as a basis for estimating the cost for the plan.

Sample meals for a month, with recipes and lists of foods used in their preparation for a family of four, are being developed, and will be available upon request from the Consumer and Food Economics Institute. These sample meal plans show how foods in the thrifty plan can be combined into appetizing and nutritious meals.

The thrifty plan is an assortment of foods that represents as little change from average food consumption of families with relatively low food costs as required to provide a nutritious diet while controlling cost. The thrifty plan contains more meat, poultry, and fish and less dry beans, potatoes, and grain products than the economy plan, previously used as a basis for setting the coupon allotment (Table 4). However, both plans contain less meat, poultry, and fish and more dry beans and grain products than families consume on the average, as do most nutritious diets at low cost.

1/ Revisions of the three more expensive plans, the low-cost moderate-cost, and liberal plans, were presented in Family Economics Review, Winter 1975, Consumer and Food Economics Institute, Agricultural Research Service, USDA.

Food consumption of households surveyed in 1965-66 that used food valued at or slightly above the cost of the economy plan was adopted as the basis for defining the kinds and amounts of foods in the plan. Food consumption patterns of these households are believed to represent a way of eating that would be palatable to households with limited food budgets.

Foods in the plan provide for a nutritionally adequate diet--one that meets the Recommended Dietary Allowances, set in 1974 by the National Academy of Sciences-National Research Council for all nutrients for which adequate reliable food composition data are available for determining the content of the plan. (See page 9.)

The thrifty food plan is at the same general level of cost as the economy plan, accepted by Congress for setting the coupon allotment for the Food Stamp Program. 2/ The U.S. average cost of food in the thrifty plan, August 1975, for sample households and for men, women, and children of different ages is shown in Table 2.

2/ Amendments to the Food Stamp Act of 1964, House of Representatives Conference Report No. 91-1793. December 22, 1970.

THE THRIFTY FOOD PLAN

Prepared by Betty Peterkin, Judy Chassy, and Richard Kerr

The thrifty food plan presented in this report was developed by the Agricultural Research Service (ARS) of the U.S. Department of Agriculture. It replaces the economy food plan, which was used as a basis for the coupon allotment from the time the Food Stamp Program was initiated until January 1976. The thrifty food plan has been proposed as a basis for the coupon allotment, effective January 1976.

Information about the thrifty plan is presented here in three parts: (1) the thrifty plan--why it was developed, what foods it contains, how it relates to average food consumption patterns and to the economy plan it replaces, (2) the development of the plan--the model and the data used, and (3) the estimated cost for the plan.

I. The Thrifty Food Plan

What Is the Thrifty Plan?

The thrifty food plan is the least costly of four food plans developed by ARS in 1974-75. (See footnote 1/.) Like the more costly plans, this plan specifies the amounts of foods of different types (food groups) that families might use to provide nutritious diets for family members. The thrifty plan includes larger proportions of the foods that are economical sources of nutrients than the other plans.

The amounts of 15 food groups suggested in the thrifty plan for men, women, and children of different ages are shown in Table 1. These amounts can be totaled for persons of the sex and age of family members to determine the plan for any family. Food costs for the family following the plan can be estimated from costs for the plan released periodically by ARS (Table 2). In estimating these costs, ARS makes certain assumptions about the kinds and amounts of foods in the food groups based on the food consumption of households with relatively low food costs surveyed in 1965-66. A list of foods for a month typical of those used in estimating costs for the plan for a family of four is shown in Table 3.

Why Was the Thrifty Plan Developed?

The Department has prepared guides for selecting good diets at different levels of cost for over 40 years. Such guides, or food plans, have been revised from time to time to take into account new information about nutritional needs, nutritive values of foods, food consumption of families, and food prices.

Prior to 1974, the quantities of food groups in the food plans at four levels of cost--economy, low-cost, moderate-cost, and liberal--were last revised in 1964. 3/ Nutritional goals based on the Recommended Dietary Allowances (RDA) released in 1964 by the National Academy of Sciences-National Research Council (NAS-NRC) and food consumption data from a nationwide food consumption survey conducted by USDA in 1955 were used in the 1964 revision of the plans.

Certain assumptions with regard to price levels and selections of foods within food groups in estimating costs for the plans were revised slightly in 1967. Revisions took into account food prices and food consumption reported in the nationwide household food consumption survey conducted by USDA in 1965-66. Since the 1967 revision, costs for the economy plan have been estimated at 80 percent of the cost of the low-cost plan. Procedures comparable to those used in estimating costs for the other three plans could not be used for the economy plan. This was because low-income survey households in 1965, intended for use as a basis for food selections within food groups and food prices for the economy plan, were predominantly one- and two-person households with food selections and prices inappropriate for use in costing the plan.

The four food plans were evaluated after the RDA were revised in 1968 and were found to provide acceptable levels of nutrients for which adequate reliable food composition data were available. Therefore, no changes in the plans were made at that time.

The thrifty plan was developed and the three other plans revised in 1974-75 for several reasons:

1. In 1974 the NAS-NRC revised the RDA. 4/ Recommended amounts of some nutrients were changed, and allowances for additional nutrients were designated. The 1974 RDA were used to define the lower limit for nutrients and the lower and upper limits for food energy in the plans. (See page 16.) Allowances set in 1974 for protein and ascorbic acid for all sex-age

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3/ Family Economics Review, October 1964. Consumer and Food Economics Research Division, Agricultural Research Service, USDA.

4/ Recommended Dietary Allowances 1974, Eighth Edition, National Academy of Sciences-National Research Council, 1974.

categories are substantially lower than the 1964 allowances used in developing the earlier plans. Also, 1974 allowances for calcium, vitamin A value, riboflavin, and niacin for certain sex-age categories are lower than those set in 1964. On the other hand, thiamin allowances for all sex-age categories and iron allowances for some categories in 1974 are higher than those in 1964. Three nutrients for which allowances were not set in 1964--vitamin B_6, vitamin B_{12}, and magnesium--were considered in development of the new plans.

2. The nutritive values of some major types of foods have changed since 1964. For example, many ready-to-eat cereals are now fortified with one-fourth or more of the RDA for many nutrients; enriched bread and flour have more thiamin, riboflavin, and niacin added than in 1964. New information on the content of nutrients in foods has become available. For example, limited information on the vitamin B_6 and vitamin B_{12} content of foods is now available and was used to estimate the amount of these nutrients in the plans.

3. Information on food eaten by men, women, and children of different ages on a nationwide basis became available. USDA's 1965-66 survey of household food consumption provided information for the first time on the food intake of individuals in the household. 5/ It also provided detailed information on the quantities and money value of food used (purchased, home-produced, or received as gift or pay) by the total household. 6/ Data from this study were used to estimate the amounts of groups of foods used to prepare meals and snacks for men, women, and children of different ages in households using food at various levels of cost. These amounts of food groups made up the food consumption patterns used in developing the new plans. (See page 14.)

4. Shifts occurred in food prices between 1964 and 1974. Prices for most foods increased, but some increased more sharply than others. Several foods that are generally used in large amounts in the less costly plans, such as dry beans and potatoes, were among those that increased sharply in price. They were not, therefore, as economical relative to other foods in 1974 as they were in 1964. To account for shifts in the relative economy of foods, prices paid by survey families in 1965-66, updated to 1974 levels, were used in revising the plans.

5/ Food and Nutrient Intake of Individuals in the United States, Spring 1965, Household Food Consumption Survey 1965-66, Report No. 11, USDA-ARS, January 1972.

6/ Food Consumption of Households by Money Value of Food and Quality of Diet, Household Food Consumption Survey 1965-66, Report No. 17, USDA-ARS, October 1972.

5. Computerized techniques were designed for developing food plans, as they have been for solving many other nutrition and food service related problems. A quadratic programing model was used to find the combination of food groups (food plan) that represents as little change from the food consumption pattern as required to meet the nutritional goals at a given cost. It is assumed in this model that conformity to existing food consumption patterns is one measure of palatability of a diet. Additional information about the model and the data used is presented in part II, page 13.

6. The amounts of foods suggested in the 1964 food plans for some sex-age categories were similar even though amounts of certain nutrients recommended for those categories were slightly different. To simplify the plans, such categories are combined in the new plans. The 1964 plans were for 18 sex-age categories and for pregnant and nursing women; the 1974-75 plans are for 12 sex-age categories and for pregnant and nursing women.

7. Ready-made bakery products were included with flour, cereal, and bread as one of the food groups for which amounts of foods were specified in the 1964 plans. Bakery products, more prominent in the marketplace in 1974, generally are not as economical as flour and cereal as sources of most of the nutrients they provide. In the new plans, flour, cereal, bread, and other bakery products are included as four separate food groups.

Food Groups--Foods They Contain

Foods within a food group are similar to each other in nutritive value. In some groups--meat, poultry, and fish, for example--one food in the group might be used to replace another in a meal. Although each group is of special importance for one or more nutrients or as a source of food energy, several groups may provide appreciable amounts of the same nutrient. The cost of providing the nutrient may differ considerably among groups. For example, both the meat and bread groups provide substantial amounts of iron; however, a milligram of iron from the meat group costs more than a milligram of iron from the bread group.

The food groups in the thrifty plan, as well as in the other three plans revised in 1974, are shown below with the common foods included in each. Commercially processed foods and commercially prepared mixtures are included in the group containing the main ingredient (other than water).

Milk, cheese, ice cream: Milk--whole, low-fat, skim, buttermilk, flavored, dry, evaporated, condensed; cheese; ice cream; ice milk; yoghurt.

Meat, poultry, fish: Beef, veal, lamb, pork (includes bacon and salt pork); variety meats such as liver, heart, and tongue; luncheon meats; poultry; fish; shellfish.

Eggs.

Dry beans and peas, nuts: Dry beans of all kinds, dry peas, lentils, soybeans, peanuts, peanut butter, tree nuts.

Potatoes: White potatoes.

Citrus fruits, tomatoes: Grapefruit, lemons, limes, oranges, tangerines; tomatoes.

Dark-green and deep-yellow vegetables: Broccoli, chard, collards, kale, spinach, other dark greens; carrots, pumpkin, sweetpotatoes, yellow winter squash.

Other vegetables, fruit: All vegetables and fruit not included in other groups, such as asparagus, beets, brussels sprouts, cabbage, cauliflower, celery, corn, cucumbers, green lima beans, snapbeans, lettuce, okra, onions, parsnips, peas, peppers, rutabagas, sauerkraut, summer squash, turnips; apples, avocados, bananas, berries of all kinds, cherries, dates, figs, grapes, melons, peaches, pears, pineapple, plums, prunes, raisins, rhubarb.

Flour: Flour, meal, mixes for the preparation of bakery products.

Cereal: Cereals, including ready-to-eat cereals; rice, hominy, oats, noodles, macaroni, spaghetti, bulgur, buckwheat.

Bread: Commercially prepared bread, rolls (not sweet), biscuits.

Bakery products: Commercially prepared crackers, cookies, cakes, pies, doughnuts, sweet rolls; mixtures that are mostly grains.

Fats, oils: Butter, margarine, mayonnaise, salad dressing, salad and cooking oils, shortening.

Sugars, sweets: Sugar--granulated, powdered, brown, maple; molasses; sirup; honey; jams; jellies; preserves; powdered and prepared desserts; candy.

Accessories: Coffee, tea, cocoa. Punches, ades, nectars, soft drinks, carbonated and uncarbonated fruit drinks. Baking powder, yeast, vinegar, artificial sweeteners, salt, condiments.

The Thrifty Plan and Food Consumption Patterns

Food consumption patterns 7/ for all sex-age categories provided the RDA 8/ for protein, vitamin A, thiamin, riboflavin, niacin, vitamin B_{12}, and ascorbic acid. However, patterns for some categories were short in certain nutrients as follows:

Nutrient	Sex-age category
Calcium	Teenage girls; women; men, 55 years and older
Iron	Infants; children, 1-2 years; teenage girls; women, 20-54 years
Vitamin B_6 9/	Teenage girls; women; men, 55 years and older
Magnesium 9/	All 12 years and older

Fat in consumption patterns of older teenage boys, of men, and of women 20-54 years of age provided more than 40 percent of food energy--the upper limit for fat allowed in the plans. The number of eggs in the patterns for all persons over 9 years exceeded the limit of four per week set for the plans.

In developing the plan, adjustments to consumption patterns were required to meet nutritional goals. These adjustments involved the use of less meat, poultry, fish, and eggs and more dry beans and peas, nuts, and grain products. Amounts of selected food groups in the food consumption patterns, the thrifty plan, and the economy plan for a week for the average family of four in the Food Stamp Program are shown in Table 4.

In estimating the nutritive value and the cost of the plan, it is assumed that families following the plan select the kinds and amounts of foods in each of the food groups that the survey households selected on

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7/ See page 14 for information on the derivation of food consumption patterns.

8/ RDA were increased by 5 percent in evaluating food patterns for the plan to allow for nutrient loss associated with the discard of a small amount of edible food discarded as plate waste or because of spoilage and the like.

9/ Evaluation based on rough estimate of content of food making up food consumption patterns. Content of this nutrient in many foods in the patterns is not known.

the average. The average amounts of the hundreds of foods selected by survey families are believed to provide the most reliable basis for food guides such as this plan to be used nationwide. However, such selections are not useful in interpreting the plan to families because they include all foods used by any of the survey households--many more foods than any single family uses. A list of commonly used foods for a family of four typical of those foods used in costing the plan is shown in Table 3. Sample menus for a month and lists of foods with amounts required to prepare them for a family of four following the plan are being developed and will be available from the Consumer and Food Economics Institute.

The Thrifty Plan and the Economy Plan

The amounts of most food groups in the thrifty plan for the family of four are more like those in the average consumption pattern than are the amounts in the economy plan (Table 4). Compared to the economy plan, the thrifty plan contains slightly more meat, poultry, and fish and less eggs, dry beans, potatoes, dark-green and deep-yellow vegetables, and grain products.

Nutritional Quality of the Thrifty Plan

The thrifty plan provides the nutritional goal of the RDA plus 5 percent for food energy, protein, calcium, iron, vitamin A value, thiamin, riboflavin, niacin, and ascorbic acid; and fat provides no more than 40 percent of the food energy. (See Table 5.) Nutritive values for average selections of foods within food groups 10/ were assumed in evaluating the plan.

The higher iron enrichment level for bread and flour proposed by the Food and Drug Administration in 1973 was assumed in the development of the plan. If that enrichment level is not adopted, the nutritional goal for iron will not be met by the plan for young children, teenage girls, and women of childbearing age, when average selections within food groups are made. However, the goal can be met through the frequent selection of foods providing important amounts of iron, such as liver, heart, kidney, lean meats, shellfish, dry beans, dry peas, dark-green vegetables, dried fruit, cereals with iron added, and molasses. Plans for all sex-age categories provide iron in excess of the amount specified by the NAS-NRC as likely to be furnished by a balanced and variet diet--6 mg or iron/1000 kcal--when current enrichment levels are assumed. Iron-fortified cereal is recommended for infants and children 1 to 2 years of age.

The vitamin B_6, vitamin B_{12}, and magnesium content of many foods in the plan is not known. Nevertheless, a rough estimate was made of levels provided by the plan. Foods in the thrifty plan (and the three more

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10/ See page 15 for information on nutritive values of foods used.

expensive plans) furnish more than the RDA for vitamin B_{12} but do not meet the RDA for vitamin B_6 and magnesium for several sex-age categories. Plans that meet the nutritional goals for vitamin B_6 and magnesium can be developed using the food composition data available, but such plans contain large amounts of vegetables, fruit, and cereal--two to three times as much as consumed by some sex-age categories in 1965-66. Such distortion of food consumption is not justified on this basis. Therefore, 80 percent of the RDA for vitamin B_6 and magnesium was used as the basis for goals in developing all of the USDA food plans.

Phosphorus levels of foods in the plans were not calculated but are believed to be well above the RDA. Iodization of salt is the most efficient way to supplement dietary iodine. It is recommended, therefore, that iodized salt be used in households.

The requirement for vitamin D for normal persons can be met by exposure to sunlight. However, for infants and elderly persons whose activities limit their exposure to sunlight, the allowance should be provided in the diet by such foods as eggs, liver, butter, and milk fortified with vitamin D or by supplementation.

Insufficient reliable information is available on the content in foods of the three other nutrients for which RDA are set--vitamin E, folacin, and zinc--to make reliable estimates of levels provided by the plans.

Food plans developed to meet the RDA would be expected to provide generous amounts of nutrients for most persons. The NAS-NRC states that the basis for the RDA is such that "even if a person habitually consumes less than the recommended amounts of some nutrients, his diet is not necessarily inadequate for those nutrients." (See footnote 4/.)

Allowances are not specified by the NAS-NRC for some dietary factors of adequate diets. An example is linoleic acid, an essential fatty acid found in large concentrations in many oils that come from plants. Notable exceptions are olive oil and coconut oil. Margarines, salad dressings, mayonnaise and cooking oils are usually made from one or more vegetable oils. Also, dietary fiber is necessary for the normal functioning of the intestinal tract. Good sources of fiber include whole-grain cereals, fruits, vegetables, and legumes, such as dried peas and beans.

Other Economical Food Plans

In developing and estimating costs for the thrifty plan, the basic assumption is made that families might be encouraged by nutrition educators to change the amounts of food groups they use to achieve a

nutritious diet. But they might not have either the skill or the opportunity to consistently select foods within food groups that are more economical than those made on the average by survey households with relatively low food costs.

The thrifty plan is only one of many combinations of food groups that could be developed at extremely low cost. Amounts of food groups in consumption patterns could be changed in other ways to provide nutritious diets. While such combinations would deviate further than the thrifty plan from food consumption patterns, they might be acceptable to some households.

Other plans at the same or lower cost than the thrifty plan could be developed if selections of foods within food groups were limited to only those foods which are the least expensive, rather than selections typical of those of survey households. For example, the thrifty plan contains some fluid milk, as was typical of the consumption of the survey households. Nonfat dry milk costs only about half as much as fluid milk, yet provides as much or more of most nutrients supplied by fluid milk. Therefore, a plan that assumes the use of nonfat dry milk exclusively might be developed at a cost lower than the cost of the thrifty plan. Or a plan at the same cost as the thrifty plan might be developed with only nonfat dry milk and more meat, poultry, and fish and less dry beans and grain products than the thrifty plan.

Through guidance materials and nutrition education programs, families using food stamps and other families wishing to economize on food are encouraged to, and may alter their consumption to, include only the economical foods within the food groups. 11/ However, for purposes of estimating the nutritive value and the cost of a plan for use nationwide, average selections of foods based on those made by survey families with relatively low food costs are believed to be more reasonable.

11/ One USDA publication that provides information on food shopping for consumers interested in economizing on food is "Your Money's Worth in Foods," USDA, HG-183. Single copies are available free from the Office of Communication, U.S. Department of Agriculture, Washington, D.C. 20250.

II. Development of the Thrifty Food Plan

Procedures in Brief

Procedures used in developing the thrifty food plan are summarized below:

1. Selected households surveyed in 1965-66 that could be used to show food consumption patterns of households that use food at relatively low cost.

2. Estimated the average nutritive value per pound of each of 17 selected groups of foods 12/ used by survey households.

3. Updated prices paid by survey households in 1965-66 to 1974 levels using change in retail prices of foods in U.S. cities collected by the Bureau of Labor Statistics. Computed average price per pound of food in each food group.

4. Estimated the amount of food groups used (as purchased basis) to prepare meals and snacks for a week for individuals in 12 sex-age categories and for pregnant and nursing women, using survey data on household use of food and the food intake of individuals.

5. Computed the food energy provided by food used for each sex-age category and related it to the appropriate RDA. Then for each category, adjusted amounts of food groups proportionately as necessary to provide 105 percent of the recommended allowance for food energy. These adjusted quantities are the food consumption patterns used in food plan development.

6. Defined upper and lower limits on amounts of each food group to be allowed in the plan. Defined any relationships among food groups required for the preparation of foods into meals.

7. Defined the nutritional goals for the plan based on the RDA plus 5 percent. By increasing the RDA by 5 percent, sufficient food is included in a plan meeting the goal to allow for a small discard of edible food as plate waste, etc.

8. Determined a cost for the plan for each sex-age category to assure that the general cost level was suitable for groups of households on limited food budgets and there was an equitable distribution of money for food among sex-age categories.

12/ Accessories, the 15th group shown in Table 1, was considered as three separate groups--coffee, tea, and cocoa; soft drinks, punches, and ades; and leavenings and seasonings--in

9. Used a mathematical model designed for food plan development to determine the optimum plan (combination 17 groups of foods) for each sex-age category. The optimum plan provided nutritional goals within cost and quantity limits with a minimum of deviation from the food consumption pattern (5 above).

10. Prepared a typical list of foods for a family based on (1) total amounts of 17 groups of foods in the plans for the sex-age categories of family members and (2) the distribution of foods used in largest amounts within groups by selected survey households (1 above).

Model

A quadratic programing model was used in development of the 1974-75 food plans. 13/ It selected the optimum plan for each sex-age category--the amounts of 17 food groups that represented as little change from the amounts of the food groups used (food consumption pattern) as was necessary to meet specifications. Specifications were set for the nutrient content and cost of the total plan and for quantities for each of the food groups.

"Change" was measured in terms of squared weighted deviations from the amount of food groups in the consumption pattern, and total change was minimized. The weights were set to cause deviations to be minimized on the basis of the percentage change rather than change in pounds of food groups. The squaring of weighted deviations resulted in small changes in amounts of several food groups, rather than a large change in one group to meet a specification.

A published computer program 14/ was adapted in conjunction with the development of the model. Food economists, nutritionists, and mathematicians selected and prepared input data, defined the specifications, derived the equations, adapted the computer program, and evaluated the results of each trial run.

Data Used

Data required were as follows:

1. Food consumption patterns--amounts (pounds) of 17 food groups used in preparing food for a week for each of 12 sex-age categories and for pregnant and nursing women (categories).

13/ Model developed by Joseph L. Balintfy, University of Massachusetts, in consultation with Brucy Gray, Judy P. Chassy, and Betty Peterkin, Consumer and Food Economics Institute, Agricultural Research Service.

14/ Ravindran, Arunachalam, "A Computer Routine for Quadratic and Linear Programming Problems." Communications of the Association for Computing Machinery, Inc., 15(9): 818, September 1972.

2. Nutritive value of food groups--amounts of food energy and nutrients provided on an average by a pound of each of the 17 food groups.

3. Price per pound of each of 17 food groups.

4. Nutritional goals--total amounts of food energy and 12 nutrients to be provided by the plan for each of the categories.

5. Maximum cost of the plan for each of the categories.

6. Limits on quantities of food groups in plan for each of the categories.

Food consumption patterns.--The 1965-66 Household Food Consumption Survey data were used to estimate quantities of 17 food groups for the preparation of meals and snacks for persons in the sex-age categories. Urban households used for estimating these quantities for the plan were selected by the money value of food they used per person in a week.

Households were first put in order by the money value of food they used (food costs) per person. Households from the 10th to the 25th percentile, with food costs from $5.00 to $6.99 per person per week in 1965-66, were used as the basis for food consumption patterns for the thrifty plan. In comparison, those from the 26th to the 49th percentile, $7.00 to $8.99 food costs, were used as the basis for patterns for the low-cost plan; those from the 50th to the 76th percentile, $9.00 to $11.99 food costs, for the moderate-cost plan; and those from the 77th to the 92nd percentile, $12.00 to $15.99 food costs, for the liberal plan. Households with extremely low and high food costs were excluded. Detailed information on food consumption of these groups of households is presented in Household Food Consumption Survey 1965-66, Report No. 17. (See footnote 6/.)

The households selected as a basis for consumption patterns for the thrifty plan used food valued at or slightly above the cost of the economy food plan--the cost level that was accepted by Congress for setting the Food Stamp allotment. Food patterns of such households represent a slightly more costly way of eating than persons using the economy plan could afford, a way of eating that they might select if they had a little more money to spend for food. The median income of the households with money value of food of $5.00-$6.99 was $5,190 in 1964; and about 80 percent of them reported incomes above the poverty threshold. Two-thirds of the households had diets that were rated good or fair--provided two-thirds or more of the amounts of seven nutrients recommended at the time of the survey; more than one-fifth of the households had diets that were rated good--provided recommended amounts of nutrients.

The share of food used by the survey households that was prepared for each family member is not known. But amounts were estimated by using information on the average amount of food eaten (intake) by individuals classified by sex and age. (See footnote 5/.) To do this, average intakes of foods from the food groups for persons in the sex-age categories were first weighted by the sex-age composition of the selected households to estimate the average intake per person in the households. Then the ratios of the intakes for the various sex-age categories to the estimated average intake per person in the selected households were applied to the average amount of the food group used (in terms of weight as purchased) per person by the selected households to estimate the amount of the food used for various sex-age categories.

Amounts of the 17 food groups for each sex-age category were then increased or decreased proportionately to provide the nutritional goal for food energy--RDA plus a 5 percent allowance for food discard. (See page 16.) Total food energy for a sex-age category may have differed from the goal for several reasons. For example, more or less food may have been eaten than was required to provide the RDA; or the discard of edible food due to plate waste, spoilage, and the like in the household may have been more or less than the amount allowed for in the plan. In adjusting amounts of food groups to provide the food energy goal, it was assumed that all food groups were equally affected by such differences. The adjusted amounts of food groups for a sex-age category make up the food consumption pattern for the category used in the model as a basis for developing the plan to meet nutritional goals for nutrients.

Nutritive value of food groups.--Average nutritive values per pound of 17 food groups used by selected survey households were used in the model to estimate the nutritive value of various combinations of food groups. Values were estimated for food energy, protein, fat, total saturated fatty acids, linoleic acid, oleic acid, carbohydrate, calcium, iron, magnesium, vitamin A value, ascorbic acid, niacin, riboflavin, thiamin, vitamin B_6, and vitamin B_{12}. For fatty acids, magnesium, vitamin B_6, and vitamin B_{12}, estimates were based on values for only a limited number of foods in the food groups.

Nutritive values for the edible portion of food per pound of food as purchased, from "Composition of Foods...raw, processed, prepared," USDA, AH No. 8; "Pantothenic Acid, Vitamin B_6, and Vitamin B_{12} in Foods," USDA, HERR 36; and unpublished data, were the basis for the estimates. Values were adjusted, when necessary, for vitamin losses during cooking. For meat, discard of drippings and one-half of the separable fat were assumed. For bread and flour, enrichment levels for thiamin, riboflavin, and niacin that became effective July 1975 were assumed; and for iron, the levels proposed in 1973 were assumed.

Prices of food groups.--Prices of food paid in 1965-66 by survey households selected for food consumption patterns (page 14) were updated to 1974 levels using procedures for estimating costs described on page 20.

Nutritional goals.--The 1974 RDA provided the basis for the lower limit for food energy and nutrients in the plans: RDA for food energy, protein, calcium, iron, vitamin A value, thiamin, riboflavin, niacin, vitamin B_{12} and ascorbic acid; and 80 percent of the RDA for magnesium and vitamin B_6 for all sex-age categories. (See page 9.)

The lower limits for nutrients include an allowance of 5 percent above the RDA (and above 80 percent of the RDA for magnesium and vitamin B_6) to allow for some discard of edible food without jeopardizing the nutritional quality of the diet. Such allowance is believed necessary because some edible food is discarded in most homes in the preparation of food, as plate waste or due to spoilage. (The discard of inedible parts of food, such as peelings, bone, and excessive fat, and the losses of vitamins in cooking, is allowed for in the nutritive values used in evaluating the plans.)

Upper limits for food energy of 10 percent above the RDA were used in development of the plan. Upper levels were not set for nutrients except fat, which was limited so that it provided no more than 40 percent of the food energy. This level of fat is lower than found in average U.S. diets in 1965-66, but higher than the level (35 percent) recommended by the American Heart Association (AHA). In the 1974 edition of the Recommended Dietary Allowances the AHA recommendation is mentioned, but a maximum level of fat in diets for the general population is not specified by NAS-NRC. (See footnote 4/.) No limit on cholesterol in the plans was imposed. However, eggs--a food containing considerable cholesterol--were limited to four per person per week. See "Fats in Food and Diet," Agricultural Information Bulletin 361, for information about the effects of dietary fat on health.

Maximum cost.--A maximum cost for each sex-age category was predetermined to help assure that (1) there would be an equitable distribution of money for food among sex-age categories and (2) the per capita cost of the new plan would equal that of the economy plan. 15/

To determine equitable costs for the sex-age categories, differences among categories both in the basic cost of providing the nutritional goals and in the cost of existing food consumption patterns were considered.

15/ Ten percent of the U.S. households surveyed in 1955 used food with a money value per person per week below the cost of the economy plan at that time. Similarly ten percent of the households surveyed in 1965-66 used food with a money value below the cost of the economy plan.

Such differences were approximated from the costs of two preplans--combinations of food groups in the pattern changed as little as was required to meet the nutritional goals, one at least cost and the other with no limit on cost. Certain limits on quantities of food groups were imposed, as described in the paragraph below. These preplans and their costs were determined for each sex-age category by using the quadratic programing model. Equitable costs were determined for the categories by subtracting a constant proportion of the difference between costs for the two preplans from the cost of the more expensive preplan. The proportion used was set to result in the per capita cost of the economy plan.

Limits on quantities of food groups.--Upper limits of twice the amount of food groups in the food consumption pattern and lower limits of one-half the amount were imposed. Exceptions were the fat and sugar groups, for which no more than the amount in the pattern was allowed, and the soft drinks group, for which about half the amount in the pattern was allowed. Few of these limits on quantities of food groups were binding in the development of the plan.

Upper and lower limits on the ratio of the amount of flour to the amount of leavening agents and seasonings were imposed. Certain other limits on quantities of food groups were investigated but not used in developing this food plan.

Assumptions Summarized

Several assumptions are basic to the model and the data used in developing the thrifty food plan.

1. Average amounts of groups of foods consumed by households between the 10th and the 25th percentile on a distribution of urban households (1965-66) by the money value of food used per person provide a diet that is palatable to households.

2. A diet that conforms to an average food consumption pattern is palatable; the greater the change from the pattern the less palatable the diet becomes.

3. Equal percentage changes in the amount of various food groups consumed will have equal adverse effect on palatability of the diet.

4. Small change in the average consumption of several groups of foods is preferable to a large change in the average consumption of one group of foods.

5. A person generally will not eat more than twice as much or less than half as much of any food group as is consumed on the average by persons of his sex and age.

6. Average prices paid by households between the 10th and 25th percentile on a distribution of urban households (1965-66) by the money value of food used per person were representative of those paid by households that might have used the thrifty plan at the time of the survey. Such prices reflect the assortment of container sizes and brands, the differences in quality of food selected and the price levels of the stores of purchase used by households following the thrifty plan.

7. The percentage change in a price paid for a food by survey households since the time of the survey can be approximated by the percentage change in the price collected by the Bureau of Labor Statistics for that food or a similar food.

8. An equitable distribution of money for food for household members allows for differences in their nutritional need and in food consumption patterns.

9. A "nutritionally adequate" diet is one that is made up of a variety of foods that provides the RDA for nutrients for which adequate reliable food composition data are available for determining the content of the diet.

10. The nutritive value per unit of the food group based on average selections of foods within the group made by survey households (1 above) best represents the nutritive value of selections made by users of the thrifty food plan.

11. Households following the plan select a variety of foods within each food group to provide the average nutritive value per unit of food group (10 above).

12. The foods in a food group are sufficiently similar in nutritive value to allow one food within a food group to be replaced by an equal amount of another food in the group without seriously jeopardizing the nutritional contribution of the group of foods in the plan.

13. The variety of foods within groups is sufficient to allow most families to select foods that they enjoy eating and can buy at reasonable prices in stores where they shop or can obtain from other sources.

13. Amounts of foods to buy and to serve can be described more easily in terms of 15 food groups than in terms of thousands of individual foods actually used by survey families.

14. Some discard of edible food will occur in all households as plate waste, because of spoilage, and the like.

15. Discard of edible food will occur for a food in proportion to the amount of that food in the plan. Five percent above the amount of edible food to be consumed is allowed for discard.

III. Estimated Costs for the Thrifty Plan

U.S. average costs of foods in the thrifty plan are estimated each month (See Table 2.) and released to agencies that use the costs as economic standards. The costs are also released periodically in publications prepared by ARS for leaders and consumers.

How Costs Are Estimated

Average prices paid for almost 2,000 different foods by households across the country with relatively low food costs surveyed in 1965-66 (See page 14.) are used as a basis for the estimates. These average prices reflect the assortment of container sizes and brands, the differences in quality of food selected, and the price level of the store of purchase for families who use food at relatively low cost. Procedures used in updating costs of the plans with these prices are as follows:

1. Prices paid by survey households are updated by using the percentage change in prices of a list of 93 carefully defined foods from the time of the survey to the month of the estimate. Prices for these foods are collected each month by the Bureau of Labor Statistics (BLS) from a representative sample of stores in selected cities across the country.

   For example: Survey households used as a basis for the thrifty plan paid an average price of 60 cents a pound for ground beef in 1965-66; and the price for ground beef collected by BLS in August 1975 is 50 percent higher than the price collected by BLS in 1965-66. A price of 90 cents (60¢ + 50% of 60¢) is used for ground beef in figuring the cost of the thrifty plan in August. Prices of certain other low-cost cuts of beef that were used by survey families, but are not priced regularly by BLS, are increased by 50 percent also. The percentage increases in the BLS price for other beef cuts are used to update prices paid by survey households for the numerous remaining cuts of beef they used.

2. The updated prices for foods in each food group for the thrifty plan are weighted by the average amounts of foods used by the survey households to derive a price per unit--pound, quart, or dozen.

3. The prices per unit are then multiplied by the number of units of food groups in the plan for each sex-age category (Table 1) to determine the cost of foods from each food group.

4. Costs for the food groups for each category are totaled. These totals, rounded to the nearest 10 cents, are released as the cost of food at home for a week. Unrounded weekly costs are multiplied by 4.333, then rounded to the nearest 10 cents, to estimate the cost for the month.

The August 1975 costs for the thrifty plan are shown in Table 2.

The Cost of the Plan for a Family

The cost for food at home for a family following the thrifty plan can be figured using Table 2 as follows:

1. Find the weekly cost for each person eating from family food supplies. List the amount opposite the age and sex of each person as follows:

   - For family members who eat all meals at home (or carry meals from home, such as lunches or picnics), use the weekly cost given in Table 2.

   - For family members who eat some meals out, deduct 5 percent for each meal not eaten at home from the cost in the table. For example, if a child eats lunch out five times a week, subtract 25 percent, or one-fourth, of the cost shown for the child's age group.

   - For guests and others who occasionally eat with the family, list 5 percent of the cost in the table for the proper age group for each meal. Suppose grandmother eats her midday and evening meals with the family every Sunday. Add 10 percent, or one-tenth, of the amount for women of her age.

2. Next, total the costs listed and adjust the total if there are more or fewer than four persons usually eating at the family table. Costs in Table 2 are for individuals in families of four persons. Adjustment 16/ is necessary because large families tend to buy and use foods more economically than small families. If the family has--

1 person	add 20 percent
2 persons	add 10 percent
3 persons	add 5 percent
4 persons	use as is
5 and 6 persons	subtract 5 percent
7 or more persons	subtract 10 percent

16/ Information on the derivation of the adjustment factors is available upon request from the Consumer and Food Economics Institute.

Table 1.--Thrifty Food Plan

Amounts of Food for a Week 1/

Family member	Milk, cheese, ice cream 2/	Meat, poultry, fish 3/	Eggs	Dry beans and peas, nuts 4/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 5/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year	4.95	.39	1.2	.15	.41	.55	.09	2.49	1.02 6/	.02	.08	.04	.04	.19	.05
1-2 years	3.30	.83	3.3	.17	.22	.89	.65	2.26	1.02 6/	.31	.78	.24	.11	.30	.37
3-5 years	3.54	.95	2.5	.28	.20	.92	.88	2.28	1.03	.37	.94	.53	.38	.74	.59
6-8 years	4.22	1.27	2.4	.49	.22	1.10	1.23	2.50	1.12	.62	1.42	.79	.51	.94	.84
9-11 years	4.92	1.61	3.4	.53	.28	1.52	1.48	3.38	1.34	.81	1.82	1.10	.60	1.20	1.10
Male:															
12-14 years	5.18	1.79	3.6	.67	.33	1.45	1.59	3.30	1.22	.81	2.07	1.13	.77	1.21	1.45
15-19 years	5.08	2.35	4.0	.43	.32	1.70	2.10	3.43	.98	.99	2.36	1.46	1.00	1.05	1.73
20-54 years	2.57	3.03	4.0	.44	.39	1.80	2.02	3.69	.89	.92	2.29	1.33	.95	.86	1.24
55 years and over	2.37	2.45	4.0	.25	.51	1.85	1.75	3.77	1.09	.80	1.90	1.12	.79	.94	.73
Female:															
12-19 years	5.35	1.80	3.8	.28	.42	1.74	1.22	3.61	.72	.76	1.49	.84	.51	.74	1.36
20-54 years	2.81	2.41	4.0	.27	.52	1.86	1.51	3.39	.90	.67	1.41	.67	.57	.57	1.18
55 years and over	2.85	1.84	4.0	.19	.60	2.02	1.26	3.73	1.12	.68	1.30	.58	.37	.45	.66
Pregnant	5.25 7/	2.69	4.0	.42	.56	2.17	1.89	4.03	1.13	.58	1.41	.66	.59	.58	1.48
Nursing	5.25 7/	3.00	4.0	.38	.57	2.36	1.92	4.27	.98	.63	1.56	.82	.80	.75	1.54

1/ Amounts are for food as purchased or brought into the kitchen from garden or farm to prepare all meals and snacks for the week. Amounts allow for a discard of about 5 percent of the edible food as plate waste, spoilage, etc.

2/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz.; cottage cheese, 2-1/2 lbs.; ice cream or ice milk, 1-1/2 quarts; unflavored yoghurt, 4 cups.

3/ Bacon and salt pork should not exceed 1/3 pound for each 5 pounds of this group.

4/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 pound of canned dry beans--pork and beans, kidney beans, etc.--as .33 pound.

5/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

6/ Cereal fortified with iron is recommended.

7/ For pregnant and nursing teenagers, 7 quarts is recommended.

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Table 2.--Cost of Food at Home Estimated for the Thrifty Food Plan 1/
August 1975, U.S. Average

Sex-age groups	Cost for-- 1 Week	1 Month
	Dollars	Dollars
FAMILIES		
Family of 2: 2/		
20-54 years	22.70	98.00
55 years and over	20.20	87.50
Family of 4:		
Couple, 20-54 years and--		
-Children, 1-2 and 3-5 years	31.90	138.40
-Children, 6-8 and 9-11 years	38.60	166.90
Household receiving food stamps 3/	35.70	154.50
INDIVIDUALS 4/		
Child:		
7 months to 1 year	4.40	19.30
1-2 years	5.10	22.30
3-5 years	6.20	27.00
6-8 years	8.00	34.50
9-11 years	10.00	43.30
Male:		
12-14 years	10.70	46.30
15-19 years	11.80	51.10
20-54 years	11.40	49.20
55 years and over	10.10	43.60
Female:		
12-19 years	9.50	41.20
20-54 years	9.20	39.90
55 years and over	8.30	35.90
Pregnant	11.40	49.30
Nursing	12.10	52.60

1/ The cost of the food plan was first estimated by using the average price per pound of each food group paid by urban survey families with relatively low food costs in 1965-66. These prices were adjusted to current levels by use of "Estimated Retail Food Prices by Cities" released periodically by the Bureau of Labor Statistics.
2/ Ten percent added for family size adjustment. See footnote 4.
3/ Costs are for average sex-age composition of survey households of four persons, National Survey of Food Stamp and Food Distribution Recipients, November 1973.
4/ The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person--add 20 percent; 2-person--add 10 percent; 3-person--add 5 percent; 5-or6-person--subtract 5 percent; 7-or-more-person--subtract 10 percent.

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Table 3.--Food List for a Month Based on the Thrifty Food Plan
Average 4-Person Household Receiving Food Stamps

Milk (includes nonfat dry milk)	54 qt	Fruit, canned	5-1/2 lb
Cheese	4-3/4 lb	Fruit juice, canned	2-1/2 lb
Ice cream	6 qt	Lettuce, salad greens	4 lb
Beef	13 lb	Cabbage	2-1/2 lb
Pork	6-1/2 lb	Other fresh vegetables	7-1/2 lb
Variety meat	3-1/2 lb	Snapbeans, canned	2 lb
Poultry	7 lb	Green peas, canned	2 lb
Fish	2 lb	Other canned and frozen vegetables, vegetable soup	7 lb
Eggs	5 doz	Flour and mixes	12 lb
Dry beans	2-1/2 lb	Cornmeal	3 lb
Mature beans, canned	4 lb	Rice or pasta	6 lb
Peanut butter	2-1/2 lb	Ready-to-eat cereal, other cereal	8 lb
Carrots	3 lb	Bread	26 lb
Dark-green leafy vegetables	2 lb	Crackers	2-1/2 lb
Other dark-green and deep-yellow vegetables	1-1/2 lb	Other bakery products; soups, mainly rice or pasta	11-1/2 lb
Citrus fruit or juice	17 lb	Margarine, butter	5 lb
Tomatoes, tomato products	9 lb	Shortening, oil or salad dressing	5 lb
Potatoes	24 lb	Sugar	8 lb
Apples	8-1/2 lb	Other sweets	5-1/2 lb
Bananas	5 lb		
Other fresh fruit	8-1/2 lb		

Note: Provides for the average food needs (as suggested in the thrifty food plan for men, women, and children of different ages) of 4-person households receiving food stamps, National Survey of Food Stamp and Food Distribution Program Recipients, November 1973. In addition to foods listed, most families use some other foods: coffee, tea, cocoa, soft drinks, punches, ades, leavening agents, and seasonings. Approximately 5 percent above the cost of the foods on the list is allowed for purchase of these foods when costs for the plan are estimated.

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Table 4.--Food Consumption Pattern, Thrifty Food Plan, and Economy Food Plan Average 4-Person Household Receiving Food Stamps 1/

Food group	Quantity per household per week		
	Food consumption pattern 2/	Thrifty food plan	Economy food plan
Milk, cheese, ice cream 3/.....quart	14.1	15.2	16.0
Meat, poultry, fish.....pound	12.9	7.4	7.0
Eggs.....dozen	1.6	1.1	1.7
Dry beans and peas, nuts 4/.....pound	1.0	1.4	1.8
Potatoes.....pound	5.2	5.5	10.4
Dark-green, deep-yellow vegetables....pound	1.5	1.5	3.4
Citrus fruit, tomatoes.....pound	6.8	6.0	6.1
Other vegetables, fruit.....pound	14.2	12.6	11.8
Grain products 5/.....pound	8.5	11.4	11.8
Fats, oils.....pound	2.4	2.3	2.2
Sugar, sweets.....pound	3.4	3.1	2.4

1/ Sex-age composition of household based on National Survey of Food Stamp and Food Distribution Program Recipients, November 1973.

2/ Based on food consumption of urban survey households that used food valued at or slightly above the cost of the economy plan, 1965-66.

3/ Fluid milk, or its calcium equivalent in evaporated milk, dry milk, cheese, and ice cream.

4/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter.

5/ Weight in terms of flour and cereal

Table 5.--Nutritive Value for Thrifty Food Plan 1/

as Percentage of the Nutritional Goals 2/

	Child					Male				Female				
	Under 1 year	1-2 years	3-5 years	6-8 years	9-11 years	12-14 years	15-19 years	20-54 years	55 years or more	12-19 years	20-54 years	55 years or more	Pregnant	Nursing
Food energy	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Protein	223	204	182	200	208	198	170	150	130	159	147	135	111	132
Calcium	166	100	100	125	126	106	106	110	100	100	100	100	101	103
Iron	100+ 3/	100+ 3/	115	185	179	135	152	257	233	104	109	192	121	125
Vitamin A value	173	140	134	120	117	100	109	108	110	131	132	134	125	111
Ascorbic acid	100	100	105	126	157	149	167	164	163	160	160	167	146	116
Niacin 1/	194	218	204	210	213	215	204	224	221	227	248	249	250	229
Riboflavin	271	219	166	171	192	172	147	133	133	164	156	171	150	136
Thiamin	157	175	146	137	144	139	134	135	146	138	150	151	125	127
Vitamin B_6	330	285	195	172	165	148	118	115	110	100	100	100	100	100
Vitamin B_{12}	100+ 4/	100+ 4/	286	244	223	184	193	172	159	170	157	148	156	159
Magnesium	313	174	146	148	143	126	111	114	103	118	111	108	100	100

1/ Nutritive value of the edible portion of food as purchased, adjusted to allow for vitamin losses in cooking. Discard of meat drippings and one-half of the separable fat from meat is assumed. For bread and flour, enrichment levels for iron proposed in 1973 are assumed. Values for niacin for all foods include niacin in the food and an estimate of the niacin formed in the body from the protein substance, tryptophan. Values for vitamin B6, vitamin B12, and magnesium are estimated for many foods in the plans because of insufficient information on content of foods.

2/ Nutritional goals are based on the Recommended Dietary Allowances, 1974, for all nutrients except vitamin B6 and magnesium, for which 80 percent of the RDA is used. The goals, the RDA base plus 5 percent, allows for some discard of edible food. Therefore, the amounts of foods in the plan provide 5 percent more than the percentage shown, if no edible food is discarded. A range of 105 to 110 percent of the RDA for food energy is allowed. Fat is limited to provide no more than 40 percent of food energy.

3/ Assumes that cereal fortified with iron is used. Percentage varies depending on the level of fortification of cereals used.

4/ Percentage varies depending on level of fortification of cereals used.

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PART C

THE EFFECT OF HOUSEHOLD SIZE ON THE COST OF DIETS THAT ARE NUTRITIONALLY EQUIVALENT

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Summary

Large households tend to buy and use food more economically than small households. The magnitude of these economies was estimated from the cost of nutritionally equivalent diets among households of different sizes from a nationwide survey. Economy of scale factors based on results of the study will be used in estimating the cost of food at home for families of different sizes following the USDA family food plans, starting in August 1975. The new factors differ from those used earlier for only households of six persons.

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THE EFFECT OF HOUSEHOLD SIZE ON THE COST OF DIETS THAT ARE NUTRITIONALLY EQUIVALENT

Introduction

Costs are estimated monthly for the USDA family food plans at different levels of cost (1). Estimates are presented for food at home separately for individuals in 12 sex-age categories and for pregnant and nursing women (Table 1). From these estimates, costs for households of different size and composition are now figured by (a) totaling costs shown for individuals of the sex and age of household members and (b) adjusting the total if there are more or fewer than four people in the household. Costs shown are for individuals in 4-person households, and adjustment is necessary because large households tend to buy and use food more economically than small ones. Adjustments for households of different sizes are as follows:

1 person	add 20 percent
2 persons	add 10 percent
3 persons	add 5 percent
4 persons	use as is
5 persons	subtract 5 percent
6 or more persons	subtract 10 percent

These household size adjustment factors, or economy of scale factors, were derived using data on food consumption and diet quality for groups of nonfarm households surveyed in 1955 (2). Economy of scale studies (unpublished) were made with data for groups of households surveyed in 1965 (3) but adjustment factors were not revised based on these studies. Recently a study using regression analysis with data for over 4,000 nonfarm households surveyed in 1965 was made. Results of this study, reported here, are the basis for household size adjustment factors to be used in estimating household costs for food plans starting August 1975.

Generally less money is spent for food per person in large households than in small households. Studies of household food consumption and expenditures over several decades have substantiated this fact. It is hypothesized that lower food costs per person in large households result in part because large households can buy and use food more economically than small households: (a) Large households buy food in larger quantities at lower unit costs. (b) They use food more efficiently with less spoilage and other food discard than smaller households, and (c) they may be more likely to use other good food management practices because of lower per capita income, frequently found in large households.

A study of prices paid by urban households surveyed in 1965 showed that on the average large households paid lower prices per pound than small households for similar foods (4). One-person households paid prices that were 11 percent higher, and 2-person households paid prices that were 7 percent higher than 6-person households paid, based on costs for a market basket of about 400 foods.

In addition to economies in buying and using food, many other factors affect food costs among households of different sizes. Some of these are differences in household buying power and differences in the kinds and amounts of food needed because of the sex and age of household members. In turn, the cost of food used may influence the nutritional quality and palatability of the diet.

In this study an attempt is made to measure economies associated with buying and using food that occur in households of different sizes that have similar (a) buying power, (b) food needs, measured in money value, and (c) nutritional quality of diets. Palatability of diets could not be considered because measures of palatability are not available from the food consumption survey data.

Sample Households

Households were selected from those surveyed in the nationwide Household Food Consumption Survey, Spring 1965 (3). They consisted of 4,376 urban and rural nonfarm households that reported money income, after Federal and State income taxes were deducted, above the Federal poverty threshold 1/ (5).

The average household size of sample households was 3.25 persons, when one person was counted as 21 meals from the household food supply during a week. (See Glossary.) Less than 10 percent of the households were large--had six or more persons (Table 2). About 10 percent were 1-person and 28 percent were 2-person households.

Homemakers in sample households of all sizes had an average of about 11 years of formal schooling. The average age of homemakers in all households studied was 43 years. Homemakers in 1- and 2-person households were somewhat older, averaging 57 and 51 years, respectively; those in 4-person households and larger ones averaged less than 40 years.

1/ A preliminary study of about 1,000 households with incomes below the poverty threshold showed a slightly greater differential in per capita cost of nutritionally equivalent diets between 4-person households and smaller households than reported here. Results were neither sufficiently different from those found here nor sufficiently conclusive to warrant the use of different households size adjustment factors for food plans at lower cost levels.

Sample households used food with an average money value of $10.18 per person per week in 1965. The average money value of food used per person in small households was greater than in large ones: 1-person households, $13.19; 4-person households, $9.26; and 7-person households, $7.21 per person per week. Only about one of seven households in the sample used food valued at less than the cost of the low-cost food plan at the time of the survey.

Food costs for many households were higher than necessary judged by the quantity of edible food brought into the kitchen for use during the week that must have been discarded. The amount of discard for many households appears to have been large, based on the food energy (calories) provided by food brought into the kitchen for use in preparing meals and snacks relative to the recommended amounts of calories for household members. On the average, sample households brought food into the house that provided calories about 50 percent above recommended allowances. Higher food energy levels were associated with high money value of food per person (Tables 3 and 4).

Some calorie overages are to be expected. Calories are calculated for the edible parts of food as brought into the kitchen for use during the survey week. Some discard is unavoidable--such as food that sticks to cooking utensils or dishes. Some discard of edible food may even be desirable--drippings and excess fat from meat, for example. What appear to be excesses in calorie content of diets may have been required in some households because members were very active. If excesses in calories in a household diet were not accounted for by the discard of edible food or unusually high food energy needs, they may have contributed to overweight of some household members.

High food energy levels were associated with smaller households and with those with older homemakers (Tables 2 and 4). High food energy levels in small households that reflect discard of edible food may also reflect inefficiencies in the use of food that this study is attempting to measure.

Fifty-four percent of the household diets provided the Recommended Dietary Allowance (RDA) set by the National Academy of Sciences-National Research Council in 1963 (6) for the seven nutrients studied. An additional 22 percent provided recommended amounts of six of the nutrients. Very large households were least likely to have diets that met the RDA for the seven nutrients studied as follows:

Household size	Household diets meeting RDA
Persons	Percent
One	55
Two	57
Three	56

Four	55
Five	51
Six	42
Seven or more	45

Analysis

Multiple regression techniques were used to determine the difference in food costs among households of different sizes attributable to economies of scale as distinct from buying power, nutritional quality of diet, and sex-age composition of the household.

The cost of the household diet in this study is defined as the money value of all food used at home or carried from home per person per week, or per 21 meals. (For further explanation of these and other terms, see Glossary, page 21.) Buying power of households is indicated by money income after taxes per person.

The cost of the low-cost food plan, not adjusted for economies of scale, was used as a proxy variable for the sex-age composition of different size households. The food plan cost per person for each household was calculated by weighting the cost of the plan for persons of the sex and age of household members by the number of meals eaten by the household members from the household food supply during the week of the survey. This cost is a measure of the cost of food required to meet the nutritional needs of the household as determined by its sex-age composition. The food plan cost is particularly well suited for use in this study where interest in household composition is limited to its effect on the amount of money required for food.

The nutritional quality of household diets was measured six ways.

1. Diet score.--Sum of percentages of the Recommended Dietary Allowances (1963) for food energy and seven nutrients for household members provided by the food used in the household. A maximum of 100 percent for food energy or any nutrient was used. A scoring system similar to this was used by Madden and Yoder in their study "Program Evaluation: Food Stamps and Commodity Distribution in Rural Areas of Central Pennsylvania" (7).

2. Number of RDA met.--Number of nutrients for which food used in the household provided at least the Recommended Dietary Allowance for household members.

3. Nutrient density ratio (NDR).--Sum, for seven nutrients, of ratios of nutrients per 1,000 calories in household diet to nutrients per 1,000 calories in RDA for household members. A maximum ratio of 1.0 for any nutrient was used. The concept of nutrients per 1,000 calories, basic to the nutrient density ratio, has been used by the Committee on Food Standards and Fortification Policy of the Food and Nutrition Board of the National Academy of Science-National Research Council. This group was requested by the Food and Drug Administration to recommend guidelines for various categories of processed food (8). The concept has been recommended as basis for an index of quality of foods by R. Gaurth Hansen (9) (10) and as a nutrition labeling tool by M. J. Babcock (11).

4. Number of NDR of 1.0.--Number of nutrients for which the household diet had an NDR of 1.0 or more.

5. Food energy per nutrition unit.--An expression of food energy in the household diet in relation to the RDA for food energy of household members.

6. Food energy level (FEL).--A variation of food energy per nutrition unit in which household diets with more than 4,350 calories per nutrition unit (150 percent of the RDA) were scored at the 4,350 calorie level. It is assumed that food energy levels up to 150 percent of the RDA may contribute positively to the nutritional quality of the diet of households, especially those in which some members are very active. The level also allows for discard of drippings and excess fat from meat and some discard of edible food as plate waste, spoilage, etc.

Any of these systems for measuring quality of diets, which were used here for statistical convenience, have shortcomings. Systems in which values for selected nutrients are added together to give a total score, as in measures 1 and 3, assume it is equally important that the diet contain recommended amounts of each of the nutrients. They rank a diet that is slightly below recommended levels for several nutrients the same as a diet well below the recommended level for a single nutrient. Systems that show only the number of nutrients for which diets meet specified levels, as in measures 2 and 4, give equal importance to meeting the allowance for each of the nutrients but no importance to how short of the allowance the diet may be. Measures 5 and 6 recognize levels of a single dietary component and disregard all others.

The five measures of nutritional quality of diets selected for use in the analysis were (1) diet score, (2) number of RDA met (3) nutrient density ratio (NDR) (4) food energy level (FEL) with NDR and (5) FEL with number of NDR of 1.0.

The diet score and the number of RDA met probably tend to overestimate the quality of diets actually consumed. Nutritive values of household diets, based on food as brought into the kitchen, include nutrients from some food that is not actually consumed. For example, no allowance is made for spoilage and discard of edible food in the preparation of food, as plate waste, etc.

By combining NDR and FEL, an attempt was made to measure the quality and the quantity aspects of the diet. The NDR measures the balance of nutrients and food energy (calories) in the diet. However, a diet with a high NDR may not contain sufficient food to meet allowances for nutrients or food energy. A diet that has both a high NDR and adequate food energy level has good balance, or quality, and contains a sufficient quantity of food to provide recommended amounts of nutrients and calories.

Although an FEL of 150 percent of the RDA for food energy, the maximum rating used here, may be needed by some households, it is more than most households probably require. A food energy level of 150 percent of the RDA (based on food brought into the kitchen for use during the week) probably indicates that an excess of food was purchased except in unusual circumstances. Some such circumstances might be (a) the household used large amounts of meat from which fat and drippings were not eaten or (b) some household members were unusually active (see page 4). Therefore, for some households the maximum FEL rating of 150 percent of the RDA for food energy may indicate an inefficient use of food with excessive levels of discard.

The relationship of money value of food per person and household size was studied as follows:

1. Households were classified (a) by household size and (b) by money value of food used per person. Means and standard deviations of household characteristics and measures of quality of diet for each class were determined (Tables 2 and 3).

2. Correlation coefficients between money value of food per person and household characteristics and measures of quality of diet were determined (Table 4).

3. Stepwise multiple regressions were run on money value of food with respect to household size, income per person, cost of the low-cost food plan, and the nutritional quality of the diet measured in each of five ways (Tables 5 to 9). Regressions were run separately for the total sample and for 7 household size categories. Regressions for the total sample frequently are not well suited to establishing economies of scale because economies are irregular from one household size to another.

4. Using results from regressions, described in 3 above, the money value of food per person in households of different sizes was determined when income per person, cost of the food plan per person, and nutritional quality of diet were held constant at the means for the total sample of 4,376 households (Table 10).

5. Household size adjustment factors, based on money value of food per person in households of different sizes were determined (Table 10).

Results

In most regressions less than half of the variation in the money value of food was explained by household size, income per person, cost of the food plan and nutritional quality of the diet (Tables 5 to 9).

Of the regressions using the five measures of nutritional quality of diets, those using NDR as the measure explained the least of the variation in the money value of food (Table 7). Regressions using FEL with NDR and FEL with the number of NDR of 1.0 as the diet quality measures explained the most (Tables 8 and 9).

The effect of household size on money value of food per person was significantly different than zero at the 1 percent level for most regressions. It was not significant even at the 5 percent level for some categories of large households (Tables 5 to 9). The number of large households in the sample was relatively small. Also there was undoubtedly great variation in food costs and factors affecting food costs among these large households.

As hypothesized, there were differences in food costs among households of different sizes that could be attributed to economies of scale relating differences in prices paid and the way food was used as distinct from buying power, sex and age of household members, and the nutritional quality of diet. The economies were greater than those found in the earlier study of cost advantages related only to prices paid by households of different sizes. (See page 3.).

Household size adjustment factors, based on averages from the regressions including the five measures of diet quality, rounded to the nearest 5 percent, will be used to estimate the cost of food at home for the USDA family food plans:

1 person	add 20 percent
2 persons	add 10 percent
3 persons	add 5 percent
4 persons	use as is
5 or 6 persons	subtract 5 percent
7 or more persons	subtract 10 percent

Conclusions

Household size adjustment factors were derived using regression analysis with data on food consumption and quality of diets for over 4,000 non-farm households surveyed in 1965. Factors are identical to those derived from group data from a survey conducted 10 years earlier, except the factor for 6-person households was changed from "subtract 10 percent" to subtract 5 percent."

The data used in this study have some obvious shortcomings. The number of large households in the sample is not sufficient for the development of sound household size adjustment factors. The data are 10 years old and during that time the food consumption of households of all sizes and incomes has undoubtedly changed somewhat. Also, changes since 1965 in packaging of foods, the storage equipment in homes and other food marketing and handling procedures have probably influenced the way families buy and use food. More recent nationwide data on food consumption and quality of diets will not be available for a few years. Results of this study will be used in estimating the costs of the food plans until such data become available.

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Table 1.--Cost of Food at Home 1/ Estimated for Food Plans at Three Cost Levels, July 1975, U.S. Average

Sex-age groups	Cost for 1 week			Cost for 1 month		
	Low-cost plan	Moderate-cost plan	Liberal plan	Low-cost plan	Moderate-cost plan	Liberal plan
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
FAMILIES						
Family of 2: 2/						
20-54 years	29.60	37.30	44.80	128.30	161.50	194.40
55 years and over	26.20	32.70	39.20	113.40	141.50	169.50
Family of 4:						
Children, 1-2 and 3-5 years	41.40	52.00	62.40	179.80	225.20	270.70
Children, 6-8 and 9-11 years	50.20	63.20	75.90	217.50	273.70	329.20
INDIVIDUALS 3/						
Child:						
7 months to 1 year	5.50	6.70	8.00	23.70	29.10	34.50
1-2 years	6.60	8.20	9.80	28.80	35.60	42.50
3-5 years	7.90	9.90	11.90	34.40	42.80	51.50
6-8 years	10.30	13.00	15.60	44.80	56.30	67.70
9-11 years	13.00	16.30	19.60	56.10	70.60	84.80
Male:						
12-14 years	13.80	17.30	20.80	59.80	75.00	90.10
15-19 years	15.30	19.20	23.20	66.30	83.30	100.30
20-54 years	14.90	18.90	22.80	64.80	82.00	99.00
55 years and over	13.10	16.40	19.70	56.70	70.90	85.40
Female:						
12-19 years	12.30	15.30	18.30	53.30	66.30	79.30
20-54 years	12.00	15.00	17.90	51.80	64.80	77.70
55 years and over	10.70	13.30	15.90	46.40	57.70	68.70
Pregnant	14.70	18.20	21.80	63.70	78.90	94.30
Nursing	15.70	19.50	23.40	67.80	84.60	101.20

1/ These estimates were computed from quantities in food plans published in Family Economics Review, Winter 1975. The costs of the food plans were first estimated by using the average price per pound of each food group paid by urban survey families at three selected food cost levels in 1965-66. These prices were adjusted to current levels by use of Retail Food Prices by Cities released periodically by the Bureau of Labor Statistics.

2/ Ten percent added for family size adjustment. See footnote 3.

3/ The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person--add 20 percent; 2-person--add 10 percent; 3-person--add 5 percent; 5-person--subtract 5 percent; 6-or-more-person--subtract 10 percent.

Table 2.--Characteristics of Households of Different Sizes [1/]

Household size in persons	Number of households	Income after taxes, 1964		Money value of food per person per week	Homemaker [2/]		Diet score	Nutrient density ratio	Food energy per nutrition unit	Cost of low-cost food plan [3/]
		Per household	Per person		Schooling	Age				
		dol.	dol.	dol.	yrs.	yrs.	no.	no.	cal.	dol.
					mean value					
All	4376	7230	2760	10.18	11.3	43	775	6.40	4487	6.30
One	436	5622	5741	13.19	11.7	57	765	6.17	5073	6.02
Two	1245	6649	3416	11.28	10.8	51	776	6.33	4785	6.29
Three	977	7128	2406	10.20	11.2	41	779	6.45	4461	6.45
Four	808	7658	1949	9.26	11.6	37	778	6.48	4236	6.35
Five	476	8516	1738	8.54	11.6	37	778	6.49	4102	6.31
Six	245	8292	1397	7.76	11.5	36	768	6.44	3939	6.21
Seven	126	8442	1219	7.21	11.5	37	763	6.44	3846	6.23
Eight	34	9086	1138	7.46	11.1	39	768	6.46	3860	6.21
Nine or more	29	10288	1102	6.89	10.9	38	751	6.33	3556	6.46
					standard deviation					
All	4376	3987	2153	4.60	2.7	15	52	.53	1454	.65
One	436	3618	3483	7.31	3.0	16	70	.68	1975	.73
Two	1245	3991	2125	4.82	3.0	16	51	.59	1587	.60
Three	977	3707	1285	3.82	2.8	14	46	.47	1308	.61
Four	808	3638	935	3.30	2.4	11	44	.45	1227	.68
Five	476	4411	925	3.03	2.4	9	42	.42	1106	.67
Six	245	4065	691	2.51	2.3	9	53	.41	1012	.66
Seven	126	4112	598	2.26	2.2	8	76	.45	1009	.58
Eight	34	3860	485	2.18	1.9	9	62	.47	941	.64
Nine or more	29	5120	548	2.25	2.5	6	68	.42	986	.52

1/ Households with 1964 income above poverty threshold. See page 21 for definition of terms.

2/ Means based on households reporting data for homemaker.

3/ Weekly cost of plan for individuals of sex and age of those eating in household, not allowing for economy of scale.

Table 3.--Characteristics of Households by Money Value of Food at Home 1/

Money value of food at home per person per week	Number of households	Income after taxes, 1964		Household size	Homemaker 2/		Diet score	Nutrient density ratio	Food energy per nutrition unit	Cost of low-cost food plan 3/
		Per household	Per person		Schooling	Age				
		dol.	dol.	no.	yrs.	yrs.	no.	no.	cal.	dol.
					mean value					
All	4376	7230	2760	3.25	11.3	43	775	6.40	4487	6.30
Under $3.00	16	4625	1463	3.78	9.2	44	485	5.89	1896	5.92
$3.00-3.99	51	5450	1775	3.79	9.4	37	616	6.09	2420	6.16
$4.00-4.99	147	5819	1753	4.20	10.2	42	694	6.19	2905	6.07
$5.00-5.99	314	6114	1820	3.98	10.7	42	737	6.31	3209	6.14
$6.00-6.99	445	6371	1946	3.87	11.1	41	759	6.36	3616	6.16
$7.00-7.99	524	6556	2125	3.61	11.3	41	774	6.38	3924	6.26
$8.00-8.99	587	6879	2163	3.61	11.2	43	783	6.41	4189	6.27
$9.00-9.99	481	7332	2604	3.22	11.4	44	786	6.43	4450	6.31
$10.00-10.99	381	7428	2914	3.00	11.5	44	789	6.43	4699	6.35
$11.00-11.99	326	7613	3008	2.87	11.4	46	792	6.44	5002	6.34
$12.00-12.99	252	7490	3183	2.79	11.2	46	793	6.41	5341	6.39
$13.00-13.99	170	8166	3485	2.76	11.6	44	794	6.46	5300	6.42
$14.00-14.99	174	7846	4010	2.41	11.5	47	796	6.44	5632	6.46
$15.00-15.99	116	9748	3967	2.82	12.1	44	799	6.50	5842	6.53
$16.00 and over	392	9157	5070	2.12	12.1	46	798	6.46	6264	6.53
					standard deviation					
All	4376	3987	2153	1.63	2.74	15	52	.53	1454	.65
Under $3.00	16	1962	621	2.24	2.14	21	132	.66	850	.67
$3.00-3.99	51	3174	1226	1.87	3.27	15	105	.64	805	.78
$4.00-4.99	147	2976	1276	2.18	2.61	16	86	.63	765	.62
$5.00-5.99	314	3268	1443	1.75	2.74	16	61	.57	713	.62
$6.00-6.99	445	3026	1249	1.73	2.92	15	56	.54	825	.64
$7.00-7.99	524	3381	1302	1.71	2.51	15	37	.54	931	.66
$8.00-8.99	587	3379	1237	1.65	2.69	15	30	.50	929	.62
$9.00-9.99	481	3947	1759	1.42	2.71	15	28	.52	1019	.65
$10.00-10.99	381	3770	2221	1.30	2.66	15	26	.50	1012	.62
$11.00-11.99	326	4106	1933	1.28	2.57	14	21	.47	1054	.61
$12.00-12.99	252	4186	1961	1.52	2.73	14	19	.54	1260	.67
$13.00-13.99	170	4121	2314	1.23	2.79	14	18	.48	1318	.66
$14.00-14.99	174	3863	2913	1.15	2.80	13	11	.47	1414	.57
$15.00-15.99	116	5800	2618	1.29	2.67	12	5	.43	1366	.67
$16.00 and over	392	5416	3280	1.02	2.72	13	10	.52	1866	.65

1/ Households with 1964 incomes above poverty threshold. See page 21 for definitions of terms.

2/ Means based on households reporting data for homemaker.

3/ Weekly cost of plan for individuals of sex and age of those eating in household, not allowing for economy of scale.

Table 4.--Correlations Between Money Value of Food, Selected Household Characteristics, and Indicators of Nutritional Quality of Diets 1/

	Money value of food per person per week	Household size (21-meal equivalent persons)	Income after taxes, 1964		Diet quality							Cost of low-cost food plan 3/
			Per household	Per person	Schooling	Age	Food energy per nutrition unit	Score	Number of RDA met	Nutrient density ratio	Number of NDR of 1.0	
	dol.	no.	dol.	dol.	yrs.	yrs.	cal.	no.	no.	no.	no.	dol.
Mean	10.18	3.25	7230	2760	11.3	43	4487	775	6.03	6.40	4.30	6.30
Standard deviation	4.60	1.63	3987	2153	2.7	15	1454	52	1.46	.53	1.73	.65
Correlation coefficient:												
Money value of food	1.00 2/											
Household size	-.33	1.00										
Income per household	.22	.21	1.00									
Income per person	.45	-.50	.56	1.00								
Homemaker's schooling	.13	-.04 *	.35	.26	1.00							
Homemaker's age	.10	-.39	-.10	.19	-.24	1.00						
Food energy per nutrition unit	.59	-.23	-.04 *	.15	-.04 *	.13	1.00					
Diet score	.36	-.01 **	.11	.05	.11	-.03 *	.46	1.00				
Number of RDA met	.43	-.06	.10	.09	.10	-.02 **	.54	.87	1.00			
Nutrient density ratio	.10	.13	.20	.02 **	.18	-.20	-.19	.31	.36	1.00		
Number of NDR of 1.0	.08	.08	.14	.03 *	.12	-.18	-.24	.19	.24	.81	1.00	
Cost of low-cost food plan	.18	.04	.19	.07	.01 **	-.15	-.09	-.10	-.07	.07	.05	1.00

1/ Households with 1964 incomes above poverty threshold. See page 21 for definitions of terms.

2/ Coefficients significant at .001 level except where otherwise noted.
* significant at .05 level
** not significant at .05 level.

3/ Weekly cost of plan for individuals of sex and age of those eating in household, not allowing for economy of scale.

Table 5.--Relationship Between Money Value of Food Per Person and Household Size, Diet Score 1/, Income Per Person, and Cost of Food Plan Per Person 2/

Statistical measure and variable	Persons in household							
	All	0.48-3.49	1.50-4.49	2.50-5.49	3.50-6.49	4.50-7.49	5.50-8.49	6.50 or more
Number of households	4376	2658	3030	2261	1529	847	405	189
Intercept	-23.597	-27.640	-24.185	-22.824	-20.314	-15.783	-12.655	-7.611
b coefficients:								
Household size	-.475	-.988	-.510	-.438	-.301	-.219	-.127	-.017
Diet score	.032	.037	.034	.032	.028	.022	.018	.015
Income per person	.072	.063	.077	.084	.085	.075	.092	.094
Cost of plan	1.321	1.608	1.154	1.172	1.127	1.086	.985	.387
Standard error of b:								
Household size	.039	.131	.082	.080	.087	.107	.141	.143
Diet score	.001	.002	.001	.001	.001	.002	.002	.002
Income per person	.003	.004	.004	.006	.008	.010	.015	.024
Cost of plan	.085	.132	.102	.096	.100	.124	.156	.241
t-ratio: 3/								
Household size	12.16	7.52	6.22	5.50	3.47	2.05*	.90**	.12**
Diet score	30.16	24.08	25.77	23.05	18.95	14.17	11.16	7.70
Income per person	24.17	16.25	19.23	14.70	11.31	7.53	6.03	3.83
Cost of plan	15.50	12.20	11.31	12.22	11.29	8.77	6.32	1.61**
R square (cumulative):								
Household size	.109	.044	.043	.036	.033	.036	.011	.001
Diet score	.245	.205	.206	.206	.198	.199	.209	.236
Income per person	.342	.297	.308	.293	.275	.261	.272	.292
Cost of plan	.376	.334	.336	.337	.331	.322	.348	.301

1/ Sum of food energy and seven nutrients provided by diet as percent of RDA, with maximum of 100 for any nutrient.

2/ Average cost of low-cost food plan for persons of sex and age of household members, spring 1965. No economy of scale applied.

3/ Values with two asterisks (**) are not significant at the 5 percent level: those with one asterisk (*) are not significant at the 1 percent level. Values not starred are significant at the 1 percent level.

Table 6.--Relationship Between Money Value of Food Per Person and Household Size, Number of RDA Met 1/, Income Per Person, and Cost of Food Plan Per Person 2/

Statistical measure and variable	Persons in household							
	All	0.48-3.49	1.50-4.49	2.50-5.49	3.50-6.49	4.50-7.49	5.50-8.49	6.50 or more
Number of households	4376	2658	3030	2261	1529	847	405	189
Intercept	-5.641	-5.224	-5.848	-5.747	-5.004	-4.212	-3.309	-.148
b coefficients:								
Household size	-.430	-.902	-.466	-.383	-.284	-.236	-.124	.043
Number of RDA met	1.274	1.518	1.299	1.148	.991	.887	.735	.680
Income per person	.070	.062	.075	.081	.080	.070	.091	.084
Cost of plan	1.366	1.594	1.196	1.255	1.223	1.168	1.007	.357
Standard error of b:								
Household size	.038	.127	.080	.077	.084	.102	.136	.137
Number of RDA met	.037	.055	.044	.043	.046	.052	.057	.074
Income per person	.003	.004	.004	.006	.007	.010	.015	.023
Cost of plan	.083	.128	.099	.093	.098	.119	.150	.228
t-ratio: 3/								
Household size	11.37	7.09	5.86	4.96	3.37	2.30*	.91**	.31**
Number of RDA met	34.49	27.66	29.68	26.59	21.60	16.91	12.81	9.19
Income per person	21.15	16.43	19.32	14.66	10.84	7.27	6.17	3.62
Cost of plan	16.43	12.45	12.06	13.46	12.53	9.78	6.70	1.57**
R square (cumulative):								
Household size	.109	.044	.043	.036	.033	.036	.011	.001
Number of RDA met	.278	.244	.244	.242	.231	.246	.254	.313
Income per person	.371	.333	.343	.326	.301	.302	.325	.358
Cost of plan	.407	.370	.373	.376	.367	.374	.393	.367

1/ The number of nutrients for which the household diet provided at least the RDA (1963) for household members eating there.

2/ Average cost of low-cost food plan for persons of sex and age of household members, spring 1965. No economy of scale applied.

3/ Values with two asterisks (**) are not significant at the 5 percent level. Those with one asterisk (*) are not significant at the 1 percent level. Values not starred are significant at the 1 percent level.

Table 7.--Relationship Between Money Value of Food Per Person and Household Size, Nutrient Density Ratio 1/, Income Per Person, and Cost of Food Plan Per Person 2/

Statistical measure and variable	Persons in household							
	All	0.48-3.49	1.50-4.49	2.50-5.49	3.50-6.49	4.50-7.49	5.50-8.49	6.50 or more
Number of households	4376	2658	3030	2261	1529	847	405	189
Intercept	-3.229	-5.156	-2.043	-1.035	1.437	-.371	-.848	.858
b coefficients:								
Household size	-.501	-.768	-.469	-.426	-.375	-.356	-.187	.004
Nutrient density ratio	.917	1.168	.886	.605	.220	.505	.514	.712
Income per person	.075	.068	.084	.097	.102	.086	.104	.101
Cost of plan	1.128	1.315	.915	.969	.921	.931	.794	.388
Standard error of b:								
Household size	.043	.145	.091	.089	.096	.118	.161	.163
Nutrient desnity ratio	.116	.159	.134	.152	.173	.216	.267	.358
Income per person	.003	.004	.004	.006	.008	.011	.018	.028
Cost of plan	.093	.144	.112	.106	.111	.137	.178	.270
t-ratio: 3/								
Household size	11.60	5.31	5.16	4.81	3.89	3.02	1.16**	.03**
Nutrient density ratio	7.93	7.35	6.60	3.99	1.27**	2.33*	1.93**	1.99*
Income per person	23.04	16.13	19.15	15.29	12.06	7.70	5.89	3.61
Cost of plan	12.13	9.11	8.20	9.13	8.30	6.78	4.47	.32**
R square (cumulative):								
Household size	.109	.044	.043	.036	.033	.036	.011	.001
Nutrient density ratio	.131	.082	.070	.049	.037	.045	.023	.031
Income per person	.232	.180	.185	.156	.136	.121	.110	.095
Cost of plan	.257	.205	.202	.187	.174	.166	.152	.096

1/ Sum of ratios for seven nutrients: nutrients per 1,000 calories in household diet/ nutrients per 1,000 calories in RDA for persons in household.

2/ Average cost of low-cost food plan for persons of sex and age of household members, spring 1965. No economy of scale applied.

3/ Values with two asterisks (**) are not significant at the 5 percent level: those with one asterisk (*) are not significant at the 1 percent level. Values not starred are significant at the 1 percent level.

Table 8.--Relationship Between Money Value of Food Per Person and Household Size, Nutrient Density Ratio 1/, Food Energy Level 2/, Income Per Person, and Cost of Food Plan Per Person 3/

Statistical measure and variable	Persons in household							
	All	0.48-3.49	1.50-4.49	2.50-5.49	3.50-6.49	4.50-7.49	5.50-8.49	6.50 or more
Number of households	4376	2658	3030	2261	1529	847	405	189
Intercept	-18.436	-20.904	-17.510	-17.424	-15.115	-15.085	-11.546	-10.110
b coefficients:								
Household size	-.416	-1.015	-.461	-.279	-.188	-.184	-.119	.044
Nutrient density ratio	1.366	1.699	1.332	1.159	.818	1.037	.666	.648
Food energy level	.283	.300	.289	.286	.275	.244	.212	.203
Income per person	.072	.061	.077	.090	.092	.079	.104	.110
Cost of plan	1.319	1.539	1.149	1.181	1.167	1.142	1.030	.665
Standard error of b:								
Household size	.038	.131	.080	.074	.077	.093	.121	.121
Nutrient density ratio	.103	.145	.118	.127	.139	.171	.201	.266
Food energy level	.008	.012	.009	.009	.009	.011	.012	.017
Income per person	.003	.004	.004	.005	.007	.009	.013	.021
Cost of plan	.082	.130	.098	.088	.089	.108	.134	.207
t-ratio: 4/								
Household size	10.88	7.77	5.80	3.79	2.44*	1.98*	.98**	.36**
Nutrient density ratio	13.27	11.75	11.27	9.13	5.88	6.06	3.31	2.43*
Food energy level	35.05	24.95	30.54	31.98	29.58	23.01	17.52	12.24
Income per person	25.02	16.06	20.06	17.04	13.70	8.97	7.86	5.28
Cost of plan	16.01	11.81	11.75	13.38	13.14	10.57	7.65	3.22
R square (cumulative):								
Household size	.109	.044	.043	.036	.033	.036	.011	.001
Nutrient density ratio	.131	.082	.070	.049	.037	.045	.023	.031
Food energy level	.290	.238	.261	.298	.327	.353	.359	.399
Income per person	.386	.322	.362	.396	.416	.420	.450	.475
Cost of plan	.420	.356	.390	.440	.475	.488	.521	.503

1/ Sum of ratios for seven nutrients: nutrients per 1,000 calories in household diet/ nutrients per 1,000 calories in RDA for persons in household.

2/ Food energy per nutrition unit with maximum at 150 percent of allowance.

3/ Average cost of low-cost food plan for persons of sex and age of household members, spring 1965. No economy of scale applied.

4/ Values with two asterisks (**) are not significant at the 5 percent level: those with one asterisk (*) are not significant at the 1 percent level. Values not starred are significant at the 1 percent level.

Table 9.--Relationship Between Money Value of Food Per Person and Household Size, Number of NDR of 1.0 1/, Food Energy Level 2/, Income Per Person, and Cost of Food Plan Per Person 3/

Statistical measure and variable	Persons in household							
	All	0.48-3.49	1.50-4.49	2.50-5.49	3.50-6.49	4.50-7.49	5.50-8.49	6.50 or more
Number of households	4376	2658	3030	2261	1529	847	405	189
Intercept	-12.057	-13.200	-11.399	-11.755	-10.760	-9.429	-8.022	-6.767
b coefficients:								
Household size	-.385	-.934	-.408	-.249	-.190	-.184	-.109	.039
Number of NDR of 1.0	.419	.547	.416	.328	.206	.238	.149	.169
Food energy level	.292	.314	.299	.291	.276	.246	.215	.209
Income per person	.072	.063	.079	.092	.095	.081	.107	.108
Cost of plan	1.332	1.542	1.157	1.185	1.156	1.125	1.017	.657
Standard error of b:								
Household size	.038	.129	.079	.073	.077	.093	.121	.122
Number of NDR of 1.0	.032	.046	.036	.036	.039	.048	.057	.076
Food energy level	.008	.012	.010	.009	.009	.011	.012	.017
Income per person	.003	.004	.004	.005	.007	.009	.013	.021
Cost of plan	.082	.130	.098	.088	.089	.109	.135	.207
t-ratio: 4/								
Household size	10.15	7.23	5.19	3.39	2.47*	1.98*	.90**	.32**
Number of NDR of 1.0	13.31	12.04	11.71	9.20	5.31	4.95	2.62	2.21*
Food energy level	35.68	25.67	31.20	32.22	29.45	22.78	17.50	12.44
Income per person	25.30	16.50	20.66	17.57	14.08	9.20	8.05	5.16
Cost of plan	16.19	11.85	11.85	13.42	13.01	10.34	7.52	3.17
R square (cumulative):								
Household size	.109	.044	.043	.036	.033	.036	.011	.001
Number of NDR of 1.0	.120	.067	.057	.041	.033	.037	.011	.008
Food energy level	.287	.235	.257	.293	.322	.344	.352	.400
Income per person	.385	.323	.364	.396	.414	.415	.447	.472
Cost of plan	.420	.357	.392	.441	.473	.481	.516	.500

1/ Number of nutrients for which household diet had an NDR of 1.0 or more.

2/ Food energy per nutrition unit with maximum at 150 percent of allowance.

3/ Average cost of low-cost food plan for persons of sex and age of household members spring 1965. No economy of scale applied.

4/ Values with two asterisks (**) are not significant at the 5 percent level: those with one asterisk (*) are not significant at the 1 percent level. Values not starred are significant at the 1 percent level.

Table 10.--Money Value of Food by Household Size (Income per person, cost of low-cost food plan, and nutritional quality of diet held constant)

Household size (persons)	Number of households in sample	Money value per person per week						Index: 4-person = 100					
		As reported	Holding constant income, cost of plan and 1/					As reported	Holding constant income, cost of plan and				
			Diet score	No. of RDA met	NDR	FEL and NDR	FEL and no. of NDR of 1.0		Diet score	No. of RDA met	NDR	FEL and NDR	FEL and no. of NDR of 1.0
		dol.	dol.	dol.	dol.	dol.	dol.	pct.	pct.	pct.	pct.	pct.	pct.
One	436	13.19	11.96	11.79	11.71	11.92	11.80	142	123	121	118	122	119
Two	1245	11.28	10.85	10.78	10.86	10.77	10.74	122	112	110	110	110	109
Three	977	10.20	10.14	10.12	10.27	10.07	10.10	110	104	104	104	103	102
Four	808	9.26	9.73	9.76	9.90	9.81	9.88	100	100	100	100	100	100
Five	476	8.54	9.32	9.38	9.47	9.57	9.64	92	96	96	96	98	98
Six	245	7.76	9.10	9.15	9.13	9.44	9.50	84	94	94	92	96	96
Seven	126	7.21	8.92	8.91	8.80	9.31	9.36	78	92	91	89	95	95
Eight	34	7.46	8.92	8.93	8.80	9.38	9.44	81	92	91	89	96	96
Nine or more	29	6.89	8.88	8.90	8.79	9.50	9.51	74	91	91	89	97	96

1/ Average values from regressions for households grouped according to a variety of household size classifications. (See Tables 1-9.) Income per person, cost of the low-cost plan, and nutritional quality of diets for households were held constant at the means for the total sample of 4,376 households.

GLOSSARY

Cost of low-cost food plan per person.--Cost of the USDA low-cost food plan, spring 1965, per person in the household with no adjustment for household size. The cost of the plan for a household is computed by weighting the cost of the plan for individuals of the sex and age of household members by the number of meals members ate from the household food supply during the week.

Diet score.--Sum of percentages of the Recommended Dietary Allowance (RDA) for all household members for food energy and seven nutrients--protein, calcium, iron, vitamin A, thiamin, riboflavin and ascorbic acid--provided by the household diet. A maximum of 100 percent for food energy or any nutrient was used. For example, a perfect diet score is 800. A diet that provided the RDA or more for food energy and six nutrients and 50 percent of the RDA for the seventh nutrient has a score of 750. The RDA for the household was determined by weighting the RDA for individuals of the sex and age of household members by the number of meals members ate from the household food supply during the week of the study.

Food energy per nutrition unit.--The relationship of food energy (calories) provided by the food used to the recommended allowance for calories for persons in the household expressed as calories from food per 2900 calories of allowance (RDA for the adult male). For example, a household diet with 4350 calories per nutrition unit, used food that provided 4350 calories for each 2900 calories in recommended allowance for household members--or 150% of the RDA (4350/2900).

Food energy level (FEL).--A variation of food energy per nutrition unit in which household diets with more than 4350 calores per nutrition unit (150 percent of the RDA) were scored at the 4350 calorie level. When the FEL is used, no additional credit for quality of diet is given a household when it uses food beyond 150% of its RDA for food energy. This is believed to allow for a maximum reasonable loss of calories, through discard of edible food, including fat drippings and separable fat from meat and poultry. FEL was expressed in hundreds of calories for regression analysis.

Homemaker's age.--The age, in years.

Homemaker's schooling.--The number of years of formal education completed.

Household size.--The total number of meals eaten at home or carried from home during the week by all persons in the household divided by 21 (based on three meals a day for seven days for one person). When meals reported eaten at home and away from home did not add to 21 meals for each person, the skipped meals were distributed as at home and away in the same proportion as the reported meals. Refreshments and snacks eaten by a family member, in addition to three meals a day, were counted as part of his meals. Refreshments and snacks served to guests were counted as one-fourth or one-half meal depending on the number of items served.

Income.--The family's money income after deduction of State and Federal income taxes in 1964 as estimated by the family member giving survey information in 1965. Income was reported by $1,000 increments up to $12,000 and by broader income ranges above $12,000. The midpoint of the increment reported is used in this study as income per household. The income per household divided by the household size is used as income per person. Income was expressed in hundreds of dollars for regression analysis.

Money value of food.--The expenditure for purchased food used at home or carried from home based on prices reported as paid by a household member plus the value of food for which prices were not reported, home-produced food, and food received as gift or instead of pay. Average prices paid for similar items by other households in the same region and urbanization were used to assign values to these foods. Federally donated foods were valued using average retail prices in the U.S. reported by the Bureau of Labor Statistics.

Money value of food per person per week.--The money value of all food used by the household during the week of the study divided by the household size.

Number of RDA met.--The number of nutrients for which the household diet provided at least the RDA (1963) for household members eating there. If the diet met the RDA for all nutrients studied, the number is "7." Such a diet would have been rated "good" in the Household Food Consumption Survey, 1965-66 (3).

Nutrient density ratio (NDR).--Sum of ratios of nutrient density in household diet to nutrient density of RDA for seven nutrients. Nutrient density of the diet is determined by dividing the amounts of nutrients by the number of 1000 calorie units provided by the household diet; nutrient density of the RDA, by dividing the allowances for nutrients by the number of 1000 calorie units in the food energy allowance. For example, the nutrient content of a diet providing 3600 calories would be divided by 3.6, the RDA for the nutrient for an individual with a food energy allowance of 2900 calories would be divided by 2.9; and the quotient for the diet would be compared with the quotient for the RDA for the nutrient. If the nutrient density (nutrient/1000 calories) in the diet is equal to the nutrient density (nutrient/1000 calories) of the RDA for a nutrient, the ratio for that nutrient is 1.0. If the nutrient density in the diet is less than in the RDA, the ratio is less than 1.0; if the nutrient density in the diet is more than in the RDA, the ratio is more than 1.0. Ratios for seven nutrients, counting ratios of more than 1.0 as 1.0, were summed to obtain a single NDR for a household diet.

Number of NDR of 1.0.--Number of nutrients for which household diet had an NDR of 1.0 or more.

PART D

ISSUES AND ANSWERS ABOUT THE THRIFTY FOOD PLAN

December 1975

SUMMARY

On September 19, 1975, there was published in the Federal Register (40 FR 43404-43410), a notice of proposed rulemaking to examine alternative proposals to establish the maximum monthly allowable income standards and the basis of coupon issuance set forth in FSP Notice 1975-1.2, effective July 1, 1975 (40 FR 19856). All proposals were based on the thrifty food plan and revised economies of scale developed by the Agricultural Research Service, United States Department of Agriculture (ARS).

In the 55 day comment period letters that contained one or more comments about the thrifty food plan were received from over 300 persons or organizations. The response to those comments as presented in the Federal Register (40 FR 55646-55656) follows:

Most of the negative comments about the thrifty plan focused on the inadequacy of the household food consumption data used in developing the plan and the insufficiency of the cost of the plan as a basis for stamps to provide nutritious diets for program participants. The response to these and other comments presented below constitutes the basis upon which this Department has rejected the objections presented and has determined to adopt the thrifty food plan.

FOOD CONSUMPTION DATA USED

Issue: More recent data might have been used.—Information from USDA's 1965–66 Household Food Consumption Survey for households with food costs at or slightly above the cost for the economy food plan (used in setting the current coupon allotment) was adopted to indicate the kinds and amounts of foods that might be palatable to families using the plan. The USDA survey data were used because no more recent data that provides sufficient detail on the quantities and prices of food used by U.S. households for food plan development are available. The following studies suggested by some commenters had been reviewed by ARS and data from them found inadequate to provide nutritional and economic data for food plan development: the National Consumer Congress' Low Income Food Consumption Survey, Spring 1975 (Food consumption data were not collected; sample was from only 10 areas); the Department of Health, Education, and Welfare's Health and Nutrition Examination Survey, and Ten-State Nutrition Survey (One day's food intake was collected but not tabulated; no price and food cost information collected); the study conducted by the University of California at Davis, "Food Distribution and Food Stamp Program Effects on Nutritional Achievement," Kern County, California (Food consumption data for only one county); and the Bureau of Labor Statistics Study of Consumer Expenditures, 1972–73 (Data, which will not be sufficient to provide required nutritional evaluation of diets, are expected to be available in 1976). Preliminary data on average expenditures for food at home from this BLS study are considerably lower than the money value of purchased food used at home from the 1965–66 survey updated to 1972–73 levels. It appears likely, therefore, that a plan based on these data, if sufficient for developing a plan, might be less costly than the thrifty plan.

Issue: 1965–66 data do not reflect current food consumption patterns.—USDA's annual estimates of the disappearance of food (national food supply) and *Supermarketing* magazine's annual study of consumer expenditures in grocery stores show no dramatic changes in food consumption patterns since 1965. These studies, though, provide information only for the country as a whole, not for households at different economic levels. It is recognized that current food consumption in low-income households in the U.S. may be somewhat different than indicated by the 1965–66 survey data. Changes in food consumption brought about by increased food prices since 1965 were probably in the same direction as changes in food patterns of survey households that were made in developing the thrifty food plan as required to meet specifications for nutrient content, palatability, and cost. Such changes were the use of less meat and more dry beans and peas and whole grain and enriched breads and cereals. Therefore, the changes of consumption patterns of low-income households in 1975 required to follow the plan would probably be *less* drastic than changes from 1965–66 patterns required in developing the nutritious plan.

Issue: The economic level of the subsample of households selected for use as a basis for the plan—those with food costs at or slightly above the cost for the economy plan—was too high to reflect food consumption patterns of poor people.—Households were selected by their food cost per person per week. Food patterns of the selected households represent a slightly more costly way of eating than persons using the economy plan (or the thrifty plan) could afford, a way of eating that they might select if they had a little more money to spend for food. These food patterns were used because they are believed to represent a diet that would be palatable to families using the thrifty plan. If households with less costly food consumption patterns and lower incomes had been selected, a similar plan at slightly lower cost probably could have been developed. This is because low-income households make more economical food choices on the average. (See below.)

Issue: Food intake of persons in sex-age categories from only households with low food costs should have been used to estimate the amount of food to purchase for sex-age categories.—Differences in the average quantity of food in the form eaten (intake) of persons in sex-age categories from *all* urban households surveyed were used to estimate the part of the food in the form as purchased that was used by households with relatively low food costs to prepare meals and snacks for household members by sex and age. The food intake by sex-age categories of a subsample of low-income households was reviewed by ARS for this purpose, but rejected because there were inadequate numbers of persons in some sex-age categories to provide reliable data. Relationships of intakes among sex-age categories for all households and for low-income households, for which cells were sizable, were similar except that older teenage boys in low-income households appeared to drink proportionately less milk on the average than in all households.

FOOD GROUPS

Issue: Plan does not allow for food preference.—The thrifty food plan is presented as amounts of 15 food groups that together make up nutritious diets for men, women, and children of different ages. Families following the plan may choose from the food groups those economical foods they enjoy eating. For example, families can select rice or pasta, depending on preference, from the cereals group. However, rice is not to be substituted for potatoes, which is in another food group, as was the concern in one letter.

Issue: Bacon and salt pork, because of their high fat and salt content, should not be in the meat group.—Generally, foods within a food group are similar to each other in nutritive value. In some groups—meat, poultry, and fish, for example—one food in the group might be used to replace another in a meal. Bacon and salt pork were placed in the meat group because some persons use them in meals as a meat. The nutrients they provide, including fat, were taken into account in computing the nutritive value of the plan, and their use is restricted to help protect the nutritional quality of diets. (See footnote 3, Table 1 on the thrifty food plan.)

ADJUSTMENT OF FOOD CONSUMPTION PATTERNS TO DEVELOP FOOD PLAN

Issue: It is not realistic to expect families to change their food consumption patterns.—Admittedly, changing food use is not easily accomplished. However, a nutritious food plan could not have been developed without adjustment of customary food patterns. Food patterns of groups of survey households used as basis for all of the food plans—even the plan at the liberal cost level—had to be adjusted to meet nutritional goals. That is, food consumption of groups of survey households at all levels of food cost had nutritional shortcomings. A quadratic programming model was used to adjust consumption patterns as little as necessary to meet specifications for the plan. Adjustments to food patterns were limited to changes in quantities of groups of foods, not "by selecting the least expensive foods within each food category" as was understood by some commenters.

Issue: Plan does not allow adequately for waste of food by needy families.—The thrifty food plan allows for some discard of *edible* food without jeopardizing the nutritional quality of the diet. Such allowance is believed necessary because quantities of foods suggested in the plans represent food as it enters the kitchen, some of which may not be eaten. The discard of *inedible* parts of food, such as peelings, bone, and excessive fat, and the losses of vitamins in cooking, are allowed for in the nutritive values used in evaluating the plans. There is little information about the amount of edible food households discard, although some *edible* food is probably discarded in most homes in the preparation of food, as plate waste or due to spoilage. Many survey households, especially those with high food costs,

used foods in amounts considerably greater than required to provide the recommended allowance for food energy for family members, indicating appreciable discard. A study of discard made by the University of Arizona in Tucson found considerably less discard in areas predominantly made up of households with incomes below the poverty thresholds than in areas with large concentrations of high-income households.

COST LEVEL OF THE PLAN

Issue: The cost of the thrifty plan was predetermined by USDA in that it was not allowed to be higher than the cost of the economy plan.—The economy food plan was first developed by ARS in 1961, several years before the Food Stamp Program became a permanent program, as a guide for leaders to use in helping needy families plan nutritious diets. The economy plan was the least costly of USDA's food plans at four levels of cost. In developing the thrifty food plan, ARS first tried to develop a plan which would provide nutritional adequacy at the cost level of the economy plan, using the same quadratic programming model, nutritional goals, and palatability constraints as used for the three more expensive plans. *Such a plan was found to be feasible.* This plan contained more meat, poultry, and fish and less dry beans, potatoes, and grain products than the economy plan, previously used for setting the coupon allotment. However, both the new plan (thrifty plan) and the economy plan contain less meat, poultry, and fish and more dry beans and grain products than families consume on the average, as do most nutritious diets at low cost. Thus, the thrifty plan met all predetermined specifications, and is more desirable than the economy plan it replaces while at the same time providing nutritional adequacy at low cost.

Issue: The cost of the plan is unreasonably low.—Practical trials were attempted to see if the plan could be used as a basis for appetizing meals. Using the thrifty plan, a set of sample meal plans—a month's meals and lists of foods and recipes needed to provide the meals for a family of four—was developed. Then, several families receiving food stamps purchased the food and prepared and served the meals. These trials showed that some families in the program can shop for and prepare satisfying meals based on the thrifty food plan. The amount of food in the plan was found to be sufficient, or too great, for all families that tried the plan. Single copies of these meal plans are available from the Consumer and Food Economics Institute, Agricultural Research Service, USDA, Hyattsville, Maryland 20782. Other meal plans, allowing for preference of individual families for foods within food groups, can be prepared based on the thrifty plan. The thrifty plan will be used by the Department in the preparation of dietary guidance materials for the many consumers and leaders who request information on how to economize on food, including food stamp recipients and leaders working with families in the program.

Issue: Allotments should be higher because food stamp recipients do not have skill in shopping and preparing food.—Skill and interest in shopping for food and preparing it are required to get a nutritious diet at all levels of cost, and the person with little money to spend for food must exercise special care in making food purchases. USDA studies indicate that many households with low food costs and/or low incomes have indeed learned to exercise such care. They make more economical choices and pay lower prices for similar foods and get greater returns in calories and most nutrients per dollar spent for food on the average than households with higher food costs and incomes. Furthermore, households surveyed in 1965 with incomes below the poverty threshold selected diets that were as nutritious on the average as households that spent similar amounts for food and had incomes above the poverty threshold.

The skill in shopping for and preparing food, insofar as it affects the selections of foods, was taken into account in both the nutritional evaluation and the costing of the thrifty plan. The average selection of foods within the food groups that survey households with relatively low food costs made were used in determining the nutritive values and costs for the plan. The average prices paid by these households are used as the basis for cost estimates. Therefore, the thrifty plan and its costs are based on the assortment of meats, of vegetables, of cereals, etc.; the assortment of container sizes and brands; the differences in quality of food selected; and the price level of the store of purchase for households using food at relatively low cost.

Issue: Food plan costs should reflect regional price differences.—Some persons felt that the plan should allow for place-to-place differences in food prices and suggested the use of the family budgets and the "Estimated Retail Food Prices in Cities" of the Bureau of Labor Statistics (BLS) for this purpose. BLS does not consider its budgets for families of city workers to be appropriate for purposes relating to needy families. Furthermore, the food component of these budgets, like the regional costs of the low-cost, moderate cost and liberal food plans published in ARS' Family Economics Review annually, reflect regional differences in food consumption as well as food prices. BLS also cautions against the use of food prices it collects in several cities each month for measuring place-to-place differences, recognizing them as useful only in measuring changes in prices over time. However, if its prices are used to estimate the cost of a market basket of foods in cities, cost differences among cities within a region are as great as cost differences among cities in different parts of the country. BLS data are authorized in the food stamp legislation for use in adjusting the coupon allotment for changes in food prices. BLS prices (U.S. average) are used by ARS to measure change in prices over time in estimating costs for the thrifty food plan as follows: The percentage change in average prices of about 100 different foods in U.S. cities collected by BLS from 1965–66 to the current month is used by USDA in updating prices paid by survey households with relatively low food costs.

ECONOMIES OF SCALE

Issue: Only urban households with low food costs should have been used to develop economy of scale factors.—Over 4,000 urban and rural non-farm survey households, without regard for food cost level, were used in developing economies of scale to be used in estimating costs of the plan for households of different sizes because the number of large households in subsamples by urbanization and food cost level were insufficient for study. However, the per capita income of households was included as a variable in the regression analyses used as a basis for the economy of scale factors, in an effort to hold economic level of households constant. Results from a preliminary study of about 1,000 households with incomes below the poverty threshold were neither sufficiently different nor sufficiently conclusive to warrant the use of different economy of scale factors for food plans at lower cost levels.

NUTRITIONAL ADEQUACY OF THE PLAN

Issue: Foods in the plan do not provide a nutritionally adequate diet.—Foods in the plan provide for a nutritionally adequate diet—one that meets the Recommended Dietary Allowances (RDA), set in 1974 by the National Academy of Sciences-National Research Council (NAS-NRC) for all nutrients for which adequate reliable food composition data are available for determining the content of the plan, with the possible exception of iron.

The higher iron enrichment for bread and flour proposed by the Food and Drug Administration in 1973 was assumed in the development of the thrifty plan (and the three more expensive USDA food plans). If that enrichment level is not adopted, the nutritional goal for iron will not be met by the thrifty plan (or the three more expensive plans) for young children, teenage girls, and women of childbearing age, when average selections within food groups are made. However, plans for all sex-age categories provide iron in excess of the amount specified by the NAS-NRC as likely to be furnished by a balanced and varied diet—6 mg of iron/1000 kcal—when current enrichment levels are assumed. Plans that meet the nutritional goals for young children, teenage girls and women of childbearing age, assuming average selections within food groups, can be developed, but they deviate drastically from food consumption patterns. The goal can be met more reasonably by these persons through the frequent selection of foods providing important amounts of iron, such as liver, heart, kidney, lean meats, shellfish, dry beans, dry peas, dark-green vegetables, dried fruit, cereals with iron added, and molasses. (One comment, that cereals with iron added were unusually expensive, was not substantiated by a CFEI study of iron levels and cost of 50

cereals available in stores in the Washington, D.C. area in the summer of 1975.)

Phosphorus levels of foods in the plans were not calculated but are believed to be well above the RDA. The use of iodized salt is recommended as an efficient way to supplement dietary iodine. The requirement for vitamin D for normal persons can be met by exposure to sunlight. However, for infants and persons whose activities limit their exposure to sunlight, the allowance should be provided in the diet by such foods as eggs, liver, butter, and milk fortified with vitamin D or by supplementation.

For several nutrients insufficient reliable information is available on the content in foods to make reliable estimates of levels provided by the plans.

Only rough estimates of the vitamin B_6, vitamin B_{12}, and magnesium content of all USDA food plans were made because their content in many foods in the plans is not known. Accordingly to these estimates, foods in the thrifty plan (and the three more expensive plans) furnish more than the RDA for vitamin B_{12} but do not meet the RDA for vitamin B_6 and magnesium for several sex-age categories. Plans that meet the nutritional goals for vitamin B_6 and magnesium can be developed by using the limited food composition data available, but such plans contain large amounts of vegetables, fruit, and cereal—two to three times as much as consumed by some sex-age categories in 1965–65. Such distortion of food consumption patterns is not justified on this basis. Therefore, 80 percent of the RDA for vitamin B_6 and magnesium was used as the basis for goals in developing all of the USDA food plans.

Food composition data for three other nutrients for which RDA are set—vitamin E, folacin, and zinc—are insufficient to estimate levels provided by the plans.

Food plans developed to meet the RDA would be expected to provide generous amounts of nutrients for most persons. The NAS-NRC states that the basis for the RDA is such that "even if a person habitually consumes less than the recommended amounts of some nutrients, his diet is not necessarily inadequate for those nutrients."

Issue: The fat level of the thrifty plan is too high.—Fat in foods in the plan provides 30 to 39 percent of the food energy, depending on the sex-age category. This level approximates the level (35 percent) recommended by the American Heart Association and is somewhat lower than found in average diets in the U.S. One commenter suggested added modification of diets to restrict fat as suggested by the Intersociety Commission for Heart Disease Resources, a group that believes enough is known to recommend that the general public should modify its diet by reducing the amount of fat (to 35 percent of food energy) and limiting certain types of fat, among other changes. Others disagree. The Committee on Nutrition of the American Academy of Pediatrics has issued a statement against the adoption of dietary changes for all children as urged by the Intersociety Commission. The Food and Nutrition Board of the National Academy of Sciences-National Research Council and the Council on Foods and Nutrition of the American Medical Association have recommended dietary modification for persons at high risk of developing heart disease. The National Heart and Lung Institutes' Task Force on Arteriosclerosis concluded that, intuitively, it would seem prudent to decrease the incidence of excessive fat levels in the blood in the population of the United States by controlling diet; however, this would be a formidable venture if it were to invoke changing the diet of the entire Nation. Before advocating such a major revolution in diet, the Task Force concluded that convincing evidence should be sought that lowering the levels of fats in blood reduced the number of cases of, and the number of deaths from arteriosclerosis. Currently, NHLI is involved in a major study to determine whether the reduction of high blood cholesterol levels and two other major risk factors for coronary heart disease will prevent or reduce the incidence of heart attacks and premature death in a high-risk segment of the U.S. population.

Issue: The sugar in the plan will cause increased dental caries.—Confronted with virtually no scientific opinion, and none from any scientific body, on what is a desirable level of sugar in the diet, ARS's aim was to control the amount of sugars and sweets in the plan, but not eliminate them. A clear cut relationship exists between sucrose and dental caries. The form in which sucrose is eaten, however, is more important than the amount consumed. The inclusion of some sugar, jams, and jellies contributes toward greater palatability of diets, especially those that contain large amounts of flour, bread and cereal.

Issue: Food stamp recipients have higher requirements for nutrients than other people (1) because they are more likely to have chronic and infectious diseases (2) because they are under stress, and (3) because they are more active than the general population.—Although special diets may be prescribed for persons with certain diseases, there is no evidence that such diets must of necessity cost more than normal diets. Indeed many ill people require less food because of inactivity associated with their illness. We know of no evidence that food stamp recipients are more likely to experience unusual stress than people with high income although the cause of stress may differ. The NAS–NRC in its 1974 edition of the Recommended Dietary Allowances recognizes the incompleteness of present knowledge of nutritional needs and cites specifically two problems under active investigation—the relationship between nutrition and the resistance to infection and stress. The NAS–NRC does not, however, at this time offer any guidelines for modifying allowances to account for infections or stress. No body of information is available indicating that food energy (calorie) needs of individuals differ with income due to occupation or other activities engaged in. Indeed, a higher incidence of overweight has been found in some low income groups than among persons with higher incomes indicating an imbalance between food intake and activity.

Issue: Only 10 percent of the 1965–66 survey households that used food at the cost of the economy plan selected nutritionally adequate diets.—This statement was made on the basis of a nutritionally adequate diet as defined at the time of the survey, using the RDA as set in 1964. Using this definition, nutrient shortages occurred in household diets most frequently for calcium, vitamin A value, and ascorbic acid. However, the economy plan, if followed, would provide a nutritious diet and was recommended by ARS consistently in USDA publications as a guide for leaders who help families to select nutritious diets at low cost.

To estimate the percentage of 1965–66 survey households using food at the cost level of the economy plan (or thrifty plan) that met the 1974 RDA would require recalculating the RDA for all survey households, a major task that has not been attempted. However, it is clear that the percentage would be higher than the 10 percent estimated using the 1964 RDA because the 1974 allowances for ascorbic acid (and for protein) for all sex-age categories are substantially lower than the 1964 allowances. Also, allowances for calcium and vitamin A value for certain sex-age categories are lower than those set in 1964. The low-cost plan was recommended as a basis for setting the coupon allotment by several persons, based on the evidence that 30 percent of the households might be expected to select nutritious diets at that cost level. If it could be shown, as may well be the case, that as many as 30 percent of the survey households that had food costs at the thrifty food plan level selected nutritious diets as defined by the 1974 RDA, the thrifty plan might be considered as suitable as a food cost standard as the low-cost plan was assumed to be when the recommendations were made.

Also relevant to this consideration are studies underway in ARS of relationships between food cost and nutritional quality of diet when a variety of measures of nutritional adequacy of the diet are used. For example, quality of diets among households with high food costs is only slightly higher than among households with low food costs if adequacy of diets is based on nutrient density measure—the ratio of nutrients to food energy for the diet related to the ratio of nutrients to food energy in the RDA. It appears that much of the improvement in diet (as measured by the percentage of diets providing the RDA) which has been attributed to higher economic level of the household, (as indicated by their income or food cost) may not reflect better diets, but more discard of edible food.

Because of these findings it appears that using percentage of households obtaining a "good" diet at any cost level probably should not be used as a basis for determining a food cost standard.

NUTRITION EDUCATION

Issue: Food stamp recipients need help in selecting foods to make up nutritious diets.—The Department agrees that educating and encouraging participants, and others as well, to select nutritious diets is of utmost importance and that nutrition education should be emphasized. The Expanded Food and Nutrition Education Program, initiated in 1969, provides some such assistance to needy families. Nutrition programs for the elderly and many other community programs also help people to select nutritious diets. Sample meal plans for a family of four for a month, developed by ARS to show how foods in the thrifty plan can be combined into nutritious and appetizing meals, may be useful to teachers and leaders who work with needy families.

The thrifty food plan which will be used by the Department in preparing dietary guidance materials for food stamp recipients will be evaluated and revised when new information on food consumption, food prices, food composition, and nutritional needs becomes available. A nationwide food consumption survey in 1977 is being planned by ARS to provide information on variation and factors affecting variation in food consumption and food prices among households and variation in food patterns of individuals in households of different sizes. With the data from this study, new methods for developing and costing the plans can be explored. More complete composition data on a wider variety of foods will be forthcoming from the Nutrient Data Bank—a repository for food composition data now being developed in ARS. This additional information will make possible a more complete assessment of the nutritional quality of foods in the plan.

PART E

FOOD PLANS FOR MEASURES OF POVERTY

November 1975

Prepared By
Judy P. Chassy

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FOOD PLANS FOR MEASURES OF POVERTY

Final Report, November 1975

Prepared by Judy P. Chassy

Several family food plans have been prepared by the Consumer and Food Economics Institute, Agricultural Research Service, Department of Agriculture (CFEI) at the request of the Office of the Assistant Secretary for Education, Department of Health, Education, and Welfare (DHEW). 1/ The food plans, prepared to meet certain economic and nutritional criteria, are for consideration in developing alternative measures of poverty in the United States.

Food plans presented in this report, like other food plans developed by USDA, show amounts of foods of different types (food groups) that families might buy, or obtain from other sources, to provide nutritious diets for family members. In each plan, amounts of food are suggested for men, women, and children of different ages (sex-age categories). A plan for any family can be determined by totaling amounts of food groups suggested for persons of the sex and age of family members. Costs of foods in the plans are estimated using prices paid by selected households surveyed in 1965-66 and prices collected monthly by the Bureau of Labor Statistics (BLS).

I. Introduction

Agencies of the Federal Government require guidelines for identifying needy families for eligibility in public assistance programs and for measuring the economic well-being of the population. The official Federal guidelines now used in deriving low-income population statistics (1) are based on a formula developed by the Social Security Administration (SSA) (2, 3). The formula contains the cost of a nutritionally good diet--the USDA economy food plan (4) developed by CFEI in the early 1960's--for families of different size and composition. Costs for a more expensive plan, the low-cost plan (4), were used by SSA in a formula for defining the "near-poor."

The economy plan and the low-cost plan used in formulas for measuring poverty were developed using data from the household food consumption survey conducted by USDA in 1955 (5) and the Recommended Dietary Allowances set by the National Academy of Sciences-National Research Council (NAS-NRC) in 1958 (6). The food plans and procedures for estimating their cost have been revised since the formulas currently used were derived (7-10). The Poverty Definition Policy Committee established by the Office of Management and Budget with technical assistance from the Subcommittee on Poverty Studies, DHEW, is examining alternative approaches to the procedures now used in deriving the low-income population statistics. The USDA's low-cost food plan, revised in December 1974 (9); the USDA thrifty food plan, released September 1975 (10); and four additional food plans are presented here for consideration in the revision of the poverty formula.

1/ Interagency Agreement: ARS Agreement No. 12-14-1001-581, April 23, 1975.

All of the food plans take into account data from the most recent research on household food consumption, food composition, and food prices. They differ in nutritional content and cost. Three sets of nutritional goals (Tables 1-3) were used in developing the plans, based on these sources: Recommended Dietary Allowances, 1974 (RDA) (11); Food and Agriculture Organization recommended intakes of nutrients (FAO) (12); and dietary standards used by DHEW in two recent studies of nutritional status (HANES/10-State) (13, 14). Differences between the RDA and the FAO recommendations are shown in Table 4; between the RDA and the HANES/10-State standards, in Table 5.

The USDA thrifty food plan 2/ (Table 6) was developed to meet the RDA; and, for this study, comparable plans (Tables 7 and 8) have been developed to meet the other two sets of nutritional goals. Estimated costs for the three plans (Table 9) and quantities of foods per person in the three plans (Table 10) can be compared. Similarly, the USDA low-cost plan (Table 11) was developed to meet the RDA and comparable plans (Tables 12 and 13) have been developed to meet the other two sets of nutritional goals. Estimated costs and average quantities of foods per person for these three plans are shown in Table 14 and Table 15.

II. Development of Food Plans for Measures of Poverty

Procedures in Brief

The procedures used in the development of food plans for measures of poverty are summarized below:

1. Three sets of nutritional goals were defined for 12 sex-age categories and for pregnant and nursing women, based on RDA, FAO recommendations, and HANES/10-State standards.

2. Groups of households were selected from those surveyed by the USDA in 1965-66 to provide food consumption patterns of households that used food at two relatively low levels of cost.

3. The amount of each of 17 groups of food used (as-purchased basis) to prepare meals and snacks for a week was estimated for individuals in 12 sex-age categories and for pregnant and nursing women, using survey data on household use of food and the food intake of individuals. Three food groups--coffee, tea, and cocoa; soft drinks, punches, and ades; and leavenings and seasonings--were considered separately for plan development, but are shown as one group--accessories--in the plans.

4. The average nutritive value per pound of each of the 17 food groups used by survey households was estimated.

2/ The per capita cost of this plan is equivalent to approximately the 10th percentile on the distribution of per capita food costs of U.S. households surveyed in 1965-66 (15). The per capita cost of the economy plan at the core of the present poverty formula was equivalent to approximately the 10th percentile on the distribution of per capita food costs of households surveyed in 1955.

5. The energy content of the food used for each sex-age category was estimated and related to the appropriate nutritional goal (RDA, FAO, or HANES/10-State). Then for each category, amounts of food groups were adjusted proportionately as needed to provide the nutritional goal for food energy. These adjusted amounts of food groups are the food consumption patterns used in food plan development.

6. The prices paid for food by both groups of survey households in 1965-66 (item 2 above) were updated to 1974 levels. The average price per pound of food in each of the 17 food groups was computed.

7. Upper and lower limits on amounts of each of the 17 food groups to be allowed in the plan were defined. Relationships among food groups required for the preparation of foods into meals were defined.

8. A maximum cost for each plan for each sex-age category was determined.

9. A quadratic programing model designed by USDA for food plan development was used to determine the optimum plan (combination of food groups) for each sex-age category. The optimum plan provided nutritional goals within cost and quantity limits with a minimum of deviation from the food consumption pattern.

Model

The quadratic programing model that was used in 1974-75 in the development of USDA's thrifty, low-cost, moderate-cost, and liberal food plans (9, 10) was also used to develop the four food plans prepared for this report. 3/ The model selected the optimum plan for each sex-age category--the amounts of 17 food groups that represented as little change from the food consumption pattern as necessary to meet specifications. Specifications were set for the nutrient content and cost of the total plan and for quantities of each food group. "Change" was measured as squared weighted deviations from the amounts of food groups in the consumption pattern. Total change was minimized. Deviations were weighted to cause changes in food group quantities to be minimized on a percentage rather than on a weight basis. Squaring the weighted deviations resulted in small changes in amounts of several food groups, rather than a large change in one group, to meet a specification.

A published computer program (16) was adapted in conjunction with model development. Food economists, nutritionists, and mathematicians defined specifications, selected and prepared input data, derived equations, adapted the program, and evaluated the results of each trial run.

3/ Model development by Joseph L. Balintfy, University of Massachusetts, in consultation with Brucy Cray, Judy P. Chassy, and Betty Peterkin, Consumer and Food Economics Institute, Agricultural Research Service.

Nutritional Goals

Three sets of nutritional goals for the 12 sex-age categories and for pregnant and nursing women were based on published RDA, FAO recommendations, and HANES/10-State standards. If sex-age categories differed from those for which allowances, recommendations, or standards were published, the allowance, recommendation, or standard for the midpoint of the range for the category was determined by interpolation. The nutritional goals are amounts of food energy and nutrients that the foods in the food plan for each sex-age category must provide on an average each day.

RDA.--The 1974 RDA (11) provided the basis for the lower limit for food energy and nutrients in the USDA plans (Table 1): RDA for food energy, protein, vitamin A activity, ascorbic acid, niacin, riboflavin, thiamin, vitamin B_{12}, calcium, and iron; and 80 percent of the RDA for vitamin B_6 and magnesium. Only 80 percent of the RDA for vitamin B_6 and magnesium was used because their content in many foods in the plans is not known. Plans developed to meet goals based on the full RDA for these two nutrients, regardless of the cost level of the plan, were severe distortions of food consumption patterns. Such distortion was not believed justified in view of the limited available data on food composition.

Phosphorus levels of foods in the plans were not calculated but are believed to be well above the RDA. Iodization of salt is the most efficient way to supplement dietary iodine. It is recommended, therefore, that iodized salt be used in households.

The requirement for vitamin D for normal persons can be met by exposure to sunlight. However, for infants and persons whose activities limit their exposure to sunlight, the allowance should be provided in the diet by such foods as eggs, liver, butter, and milk fortified with vitamin D or by supplementation.

Insufficient reliable information is available on the content in foods of the three other nutrients for which RDA are set--vitamin E, folacin, and zinc--to make reliable estimates of levels provided by the plans.

Food plans developed to meet the RDA would be expected to provide generous amounts of nutrients for most persons in the U.S. The NAS-NRC states that the basis for the RDA is such that "even if a person habitually consumes less than the recommended amounts of some nutrients, his diet is not necessarily inadequate for those nutrients." (Page 12, (11))

Allowances are not specified by the NAS-NRC for some dietary factors of adequate diets. An example is linoleic acid, an essential fatty acid found in large concentrations in many plant oils (notable exceptions are coconut and olive oils). Margarines, salad dressings, mayonnaise, and cooking oils are usually made from one or more vegetable oils, which are also sources of vitamin E. Also, dietary fiber is necessary for normal functioning of the intestinal tract. Good sources of fiber include whole-grain cereals, fruits,

vegetables, and legumes (such as dried peas and beans). For these factors and for several vitamins and minerals known to be present in diets associated with good nutritional status and health, but about which not enough research has been completed to establish RDA, the NAS-NRC states:

> "While a diet made up of ordinary foods meeting the RDA standard should maintain health, we are well aware that present knowledge of nutritional needs is incomplete. Requirements of man for many nutrients have not been established. The essentiality of several nutrients has been established only within the past few years. Also, research continues to provide new information about the relationship between nutrition and resistance to infection and stress, to cite just two problems under active investigation. Therefore, to ensure that possibly unrecognized nutritional needs are met, RDA should be provided from as varied a selection of foods as is practicable." (Page 2, (11))

With reference to trace minerals, NAS-NRC states, "Meat, fish, and some non-partitioned vegetable products are good sources of essential elements, a fact that increases their nutritional value beyond simply serving as protein sources." (Page 91, (11))

FAO recommended intakes of nutrients.--The FAO Handbook (12) provided the basis for the lower limits for food energy, protein, vitamin A activity, ascorbic acid, niacin, riboflavin, thiamin, vitamin B_{12}, calcium, and iron (Table 2, this report).

FAO recommendations for food energy were adjusted to levels appropriate for the body weights 4/ and for the light activity levels (Table 2, (12)) of the U.S. population that were assumed for the RDA. Food energy recommendations of older adults were determined as specified by FAO (Page 11, (12)).

FAO recommendations for protein, converted to grams per kilogram of body weight, were adjusted for the average body weights used in developing the RDA. Since amounts recommended are stated in terms of egg and milk protein, the amounts were increased to allow for 75 percent efficiency of utilization, as assumed for diets in the U.S. with mixed sources of protein in development of the RDA. (Page 47, (11)).

4/ Body weights used in determining RDA, adapted for food plan sex-age categories, are as follows:

Children	kg	Males	kg	Females	kg
6-12 months	9.0	12-14 years	46.1	12-19 years	49.2
1-2 years	11.9	15-19 years	61.8	20 years and over	58.0
3-5 years	17.7	20 years and over	70.0		
6-8 years	25.7				
9-11 years	35.2				

FAO recommendations for vitamin A, in terms of milligrams of retinol, were converted to International Units (IU) of vitamin A activity, assuming 50 percent of IU from carotene and 50 percent from retinol, as assumed for U.S. diets in developing the RDA (Page 53, (11)). Adjusted niacin, riboflavin, and thiamin recommendations were computed using the adjusted food energy recommendations to maintain the stated levels of 6.6 mg per 1000 kcal, .6 mg per 1000 kcal, and .4 mg per 1000 kcal, respectively (Pages 42, 44, and 39, (12)). Recommendations for calcium were stated as ranges (Table 1, (12)); midpoints of the ranges were used. For iron, amounts were designated for diets with different proportions of food energy from foods of animal origin; amounts recommended for diets with more than 25 percent (Table 1, (12)) of food energy from foods of animal origin, as in U.S. diets, were used. For vitamin B_6 and magnesium, recommendations were not listed for each sex-age category; however, references were made to the levels determined for the RDA. Therefore, the levels used for plans developed to meet the RDA were used for these nutrients. (See page 7.) No special adjustments were indicated or made for the recommendations for ascorbic acid or vitamin B_{12}. For each nutrient, the largest amount recommended for any age category of women of childbearing age was used as the basis for recommended amounts for pregnant and nursing women.

HANES/10-State standards (Table 3).--HANES standards are only for food energy, protein, vitamin A activity, ascorbic acid, calcium, and iron (13). Food energy and protein standards, per kilogram of body weight, were adjusted for the average body weights used in developing the RDA. (See footnote 2.) For vitamin A, HANES standards assumed 70 percent of the IU from carotene and 30 percent from retinol (page 181, (13)). Standards for niacin, riboflavin, and thiamin were not stated (13); therefore, 10-State standards, 6.6 mg per 1000 kcal, .55 mg per 1000 kcal, and .4 mg per 1000 kcal, respectively (page V-3, (14)), were applied to the food energy standards. No standards were specified in either study for vitamin B_6, vitamin B_{12}, or magnesium; therefore, the levels used for plans developed to meet the RDA were also used for developing HANES/10-State plans. (See page 7.) For each nutrient, the highest standard for any age category of women of childbearing age was used as the basis for standards for pregnant and nursing women.

Table 4 shows differences between the FAO recommendations and the RDA for each sex-age category for all nutrients for which the FAO stated recommendations. The FAO food energy recommendations are 100 to 300 kcal higher for six sex-age categories, the same for five sex-age categories, and 100 kcal lower for three sex-age categories. Many FAO recommendations for nutrients are lower than the RDA, but others are similar to (indicated by blanks in Table 4) or higher than the RDA.

Table 5 shows differences between the HANES/10-State standards and the RDA for each sex-age category for all nutrients for which standards were established for the DHEW studies. The HANES/10-State standards for food energy are 100 kcal higher for males 12-14 years and 600 kcal higher for nursing women. Many HANES/10-State standards for nutrients are lower than the RDA; but others are similar to the RDA (indicated by blanks in Table 5); and protein and ascorbic acid standards for several sex-age categories are higher than the RDA.

The nutritional goals used for food plan development include an allowance of 5 or 10 percent above the RDA, FAO recommendations, and HANES/10-State standards--to allow for some discard of edible food without jeopardizing the nutritional quality of the diet. A discard allowance of 5 percent was included in the plans at the thrifty plan level; 10 percent was included in the nutritional goals at the low-cost plan level. An allowance for discard is necessary because the RDA, FAO recommendations, and HANES/10-State standards refer to nutrient intake from foods actually consumed. Amounts of food groups in the food plans are for foods as brought into the kitchen--some of which may be discarded as plate waste, due to spoilage, etc. The discard of inedible parts of food, such as peelings, bone, and excessive fat, and losses of vitamins in cooking are taken into account in the nutritive values used in evaluating the food plans. (See page 13.)

Upper limits were set for food energy at 10 percent more than the RDA, FAO recommendations, and HANES/10-State standards for the food plans at the thrifty plan level; and at 15 percent more, for plans at the low-cost plan level. The only upper limit set for nutrients was that for fat, limited in all plans to provide no more than 40 percent of the food energy. This level of fat is lower than that found in average U.S. diets in 1965-66, but higher than the level (35 percent) recommended by the American Heart Association (AHA). In the 1974 edition of the RDA (11), the AHA recommendation is mentioned, but a maximum level of fat in diets for the general population is not specified. No limit on cholesterol was imposed; however, eggs--which contain considerable cholesterol--were limited to four per person per week (17).

Food Consumption Patterns

Data from the 1965-66 Household Food Consumption Survey were the basis for estimating quantities of 17 food groups (see page 11) used for the preparation of meals and snacks for a week for persons in each of 12 sex-age categories and for pregnant and nursing women.

Selection of households used for estimating food consumption patterns.--All urban households surveyed were first put in order by the money value (cost) of food they used per person in 1965-66 (15). Households with food costs between the 26th and the 49th percentiles (with food costs from $7.00 to $8.99 per week in 1965-66) were used as the basis for food consumption patterns for USDA's low-cost plan and the plans comparable to the low-cost plan based on FAO and HANES/10-State nutritional goals. Those between the 10th and the 25th percentiles, with food costs from $5.00 to $6.99 per person per week, were used as the basis for food consumption patterns for the USDA thrifty plan and the plans comparable to the thrifty plan based on FAO and HANES/10-State nutritional goals.

For both groups of survey households, the average cost of food used was the same as, or slightly higher than, the desired level of cost for the plan. Food consumption of each group of households is believed to represent a way of eating that would be palatable to households that might use the plan.

Food consumption patterns for each sex-age category.--The share of the household's food used by survey households in the preparation of food for individual family members is not known. But amounts were estimated by using information on the average amount of food eaten (intake) by individuals, data available for the first time from the 1965-66 survey (18). To do this, average intakes of foods from the 17 food groups for persons in the sex-age categories were weighted by the sex-age composition of the selected households to estimate the average intake per person in the households. The ratios of the intakes for the various sex-age categories to the estimated average intake per person in the selected households were then applied to the average amount of the food group used (in terms of weight as purchased) per person by the selected households to estimate the amount of the food group used for various sex-age categories.

The energy content of the food used for each sex-age category was computed. Amounts of the 17 food groups were then increased or decreased proportionately to provide the RDA, FAO recommendation, or HANES/10-State standard for food energy plus the food energy allowance for food discard. (See page 10.) Food energy provided by the estimated amounts of food used by a sex-age category may have differed from the goal for several reasons. For example, more or less food may have been eaten than was required to provide the goal; or the discard of edible food due to plate waste, spoilage, and the like in the household may have been more or less than the amount allowed for in the plan. This adjustment to provide the food energy goal was applied equally to all food groups. The adjusted amounts of food groups for a sex-age category make up the food consumption pattern for that category used as a basis for the food plans.

Food groups and foods they contain.--Foods within a food group are similar to each other in nutritive value. In some groups--meat, poultry, and fish, for example--one food in the group might be used to replace another in a meal. Although each group is of special importance for one or more nutrients or as a source of food energy, several groups may provide appreciable amounts of the same nutrient. The cost of providing the nutrient may differ considerably among groups. For example, foods in the meat and bread groups provide iron; however, a milligram of iron from the meat group costs much more than a milligram of iron from the bread group.

The food groups in all food plans developed in 1974-75 are shown below with the common foods included in each. Commercially prepared mixtures are included in the group containing the main ingredient (other than water).

Milk, cheese, ice cream: Milk--whole, low-fat, skim, buttermilk, flavored, dry, evaporated, condensed; cheese; ice cream; ice milk; yogurt.

Meat, poultry, fish: Beef, veal, lamb, pork (includes bacon and salt pork); variety meats such as liver, heart, and tongue; luncheon meats; poultry; fish; shellfish.

Eggs

Dry beans and peas, nuts: Dry beans of all kinds, dry peas, lentils, soybeans, peanuts, peanut butter, tree nuts.

Potatoes: White potatoes.

Citrus fruits, tomatoes: Grapefruit, lemons, limes, oranges, tangerines; tomatoes.

Dark-green and deep-yellow vegetables: Broccoli, chard, collards, kale, spinach, other dark greens; carrots, pumpkin, sweetpotatoes, yellow winter squash.

Other vegetables, fruit: All vegetables and fruit not included in other groups, such as asparagus, beets, brussels sprouts, cabbage, cauliflower, celery, corn, cucumbers, green lima beans, lettuce, okra, onions, parsnips, peas, peppers, rutabagas, sauerkraut, snapbeans, summer squash, turnips; apples, avocados, bananas, berries of all kinds, cherries, dates, figs, grapes, melons, peaches, pears, pineapple, plums, prunes, raisins, rhubarb.

Flour: Flour, meal, mixes for the preparation of bakery products.

Cereal: Cereals, including ready-to-eat cereals; rice, hominy, oats, noodles, macaroni, spaghetti, bulgur, buckwheat.

Bread: Commercially prepared bread, rolls (not sweet), biscuits.

Bakery products: Commercially prepared crackers, cookies, cakes, pies, doughnuts, sweet rolls; mixtures that are mostly grains.

Fats, oils: Butter, margarine, mayonnaise, salad dressing, salad and cooking oils, shortening.

Sugars, sweets: Sugar--granulated, powdered, brown, maple; molasses; sirup; honey; jams; jellies; preserves; powdered and prepared desserts; candy.

Accessories: Coffee, tea, cocoa. Soft drinks, carbonated and uncarbonated fruit drinks, punches, ades, nectars. Baking powder, yeast, vinegar, artificial sweeteners, salt, condiments. In the model used for food plan development, the foods in this food group were divided into three separate groups: coffee, tea, cocoa; soft drinks, punches, etc.; and leavening agents and seasonings.

Nutritive Value of Food Groups

Average nutritive values per pound of 17 food groups used by selected survey households were used in the model to estimate the nutritive value of various combinations of food groups. Values were estimated for food energy, protein, fat, calcium, iron, magnesium, vitamin A value, ascorbic acid, niacin, riboflavin, thiamin, vitamin B_6, and vitamin B_{12}. For magnesium, vitamin B_6, and vitamin B_{12}, estimates were based on values for only a limited number of foods in the food groups.

Nutritive values for the edible portion of food per pound of food as purchased, from "Composition of Foods...raw, processed, prepared," USDA AH No. 8 (19); "Pantothenic Acid, Vitamin B_6, and Vitamin B_{12} in Foods," USDA HERR 36 (20); and unpublished data were the basis for the estimates. Values were adjusted, when necessary, for vitamin losses during cooking. For meat, discard of drippings and one-half of the separable fat was assumed. For bread and flour, enrichment levels for thiamin, riboflavin, and niacin that became effective July 1975 were assumed; and for iron, the levels proposed in 1973 were assumed. 5/

When these nutritive values per pound of food groups are used with the quantities of food groups in the plan to estimate the nutritive value of the food plan, it is assumed that families following the plan select the kinds and amounts of foods in each of the food groups that the survey households with relatively low food costs selected on the average. The average selections reported by survey families are believed to provide the most reliable basis for food guides such as these to be used nationwide.

Limits on Quantities of Food Groups

Upper limits of twice the amount of food groups in the food consumption pattern (see page 11) and lower limits of one-half the amount were imposed. Exceptions were the fats and oils; sugars and sweets; coffee, tea, and cocoa food groups, for which no more than the amount in the pattern was allowed. For the plans developed as alternates to the thrifty food plan, about half the amount of soft drinks, punches, and ades group in the pattern was allowed; for the low-cost plan and its alternates, about three-fourths the amount of soft drinks, punches, and ades in the pattern was allowed. Few of these limits on quantities of food groups were binding in the development of the plans. Finally, upper and lower limits on the ratio of the amount of the flour group to the amount of leavening agents and seasonings were imposed, to help assure that meals could be prepared from the quantities of foods in the plans.

5/ If the proposed enrichment levels for iron are not adopted, the nutritional goal for iron will be met for all sex-age categories in the FAO plans, but will not be met by the RDA or the HANES/10-State food plans for young children, teenage girls, and women of childbearing age when average selections within food groups are made. However, the goals can be met through the frequent selection of foods providing important amounts of iron, such as liver, heart, kidney, lean meats, shellfish, dry beans, dry peas, dark-green vegetables, dried fruit, cereals with added iron, and molasses. Plans for all sex-age categories provide iron in excess of the amount specified by the NAS-NRC as likely to be furnished by a balanced and varied diet--6 mg of iron per 1000 kcal--when current enrichment levels are assumed. Iron-fortified cereal is recommended for infants and children 1 to 2 years of age.

Prices of Food Groups

Prices of foods paid in 1965-66 by survey households selected for food consumption patterns were updated by using the percentage change in prices of each of about 100 foods, from the time of the survey to 1974. (See page 15.) Updated survey prices were weighted by amounts of foods used by the selected households to derive prices per pound of the 17 food groups used in developing the plans.

Maximum Cost

A maximum cost for each sex-age category was predetermined to help assure that (1) for all plans, there would be an equitable distribution of money for food among sex-age categories; (2) for the thrifty and low-cost plans, per capita costs would conform to the general cost level designated for the plans; and (3) for the comparable plans at each cost level, consideration would be given to both the basic cost of providing nutritional goals and the cost of existing food consumption patterns.

The designated per capita cost of the USDA thrifty food plan was set to equal that of the economy plan (see footnote 2) when per capita costs in 1965-66 were updated to 1974 levels. (See page 15.) The designated per capita cost of the low-cost plan in 1965-66 was set to approximate the food costs of 1965-66 survey households in the second quartile on the distribution of household by money value (cost) of food per person per week (15). These designated per capita costs could be used only if plans to meet specifications could be developed at such costs.

To determine costs for the sex-age categories, differences among categories both in the basic cost of providing the nutritional goals and in the cost of the food consumption patterns on which the plan was based were considered. Such differences were approximated from the costs of two preplans--combinations of food groups in the pattern changed as little as was required to meet the RDA nutritional goals--one at least cost and the other with no limit on cost. Certain limits on quantities of food groups, as described above, were imposed. These preplans and their costs were determined for each sex-age category by using the quadratic programing model. The per capita cost of each set of preplans was computed. (The per capita costs that had been designated for each of the food plans--the thrifty and low-cost--fell between the per capita costs of the two preplans based on food consumption patterns for that plan, indicating that plans could be developed at the designated costs.) Then the proportion of the difference between the per capita costs of the two preplans that was to be subtracted from the cost of the more expensive preplan to obtain the desired per capita cost for the plan was determined. Finally, for each sex-age category, the same proportion of the difference between the cost of the two preplans for that category was subtracted from the cost of the more expensive preplan for that category to obtain the maximum cost for the category.

For the FAO and HANES/10-State plans comparable to the USDA thrifty food plan, the cost for each sex-age category was predetermined by a slightly different procedure: The costs of two preplans--one at least cost and the other with no limit on cost--were determined for the sex-age category, using both the FAO and the HANES/10-State nutritional goals instead of the RDA goals. The proportion of the difference between the preplans established for the thrifty plan was used with costs for preplans developed using FAO and HANES/10-State goals to establish costs for the FAO and HANES/10-State plans. For example, the maximum cost for each sex-age category in the FAO plan was determined by subtracting the same proportion (as for the USDA thrifty food plan) of the difference between the costs of the two preplans for that category based on FAO goals from the cost of the more expensive preplan for that category. Therefore, the cost for the FAO plan reflects the cost of preplans based on FAO goals in the same way that the USDA thrifty plan reflects the cost of preplans based on the RDA goals. Similarly, costs for the HANES/10-State plan reflect costs for preplans based on HANES/10-State goals. In determining costs for the FAO and HANES/10-State low-cost food plans, the same proportion (as for the USDA low-cost food plan) of the difference between the costs of the two preplans for each sex-age category, based on the FAO or HANES/10-State goals, was subtracted from the cost of the more expensive preplan for that category.

III. Estimated Costs for the Food Plans

Costs for Food Plans for Sex-Age Categories

Costs of foods in the food plans for each of the sex-age categories can be estimated each month; that is, as frequently as prices are collected by the BLS (21). Average prices paid for almost 2,000 different foods by the two groups of survey households in 1965-66 are used as a basis for the estimates. In each group of households, these prices reflect the assortment of container sizes and brands, the differences in quality of food selected, and the price levels of the store of purchase for families using food at that level of cost. Procedures used in updating costs of each plan with monthly BLS prices are as follows:

1. Prices paid by selected survey households are updated by using the percentage change in prices of a list of 93 carefully defined foods from the time of the survey to the month of the estimate. Prices for these foods are collected routinely by BLS from a representative sample of stores in selected cities across the country.

For example, if survey households selected as a basis for the low-cost plan paid an average price of 60 cents a pound for ground beef in 1965-66 and the price for ground beef collected by BLS in December 1974 is 50 percent higher than the price collected by BLS in 1965-66, a price of 90 cents (60¢ + 50% of 60¢) would be used for ground beef in figuring the cost of the low-cost plan in December 1974. Prices of certain other low-cost cuts of beef that were used by survey families, but are not priced regularly by BLS, would be increased by 50 percent also. The percentage increase in the BLS price for other beef cuts would be used to update prices paid by survey households for the numerous remaining cuts of beef they used.

2. The updated prices for foods in each food group for each plan are weighted by the average amounts of foods used by the survey households to derive a price per unit--pound, quart, or dozen.

3. The prices per unit are then multiplied by the number of units of the food groups in the plan for each sex-age category to determine the cost of foods from each food group.

4. Costs for the food groups for each category are totaled. These totals, rounded to the nearest 10 cents, are released as the cost of food at home for a week. Unrounded weekly costs are multiplied by 4.333, then rounded to the nearest 10 cents to estimate the cost for the month.

The Cost of a Food Plan for a Family

The cost of food at home for a family following any food plan can be figured using the costs shown (Tables 9 or 14), assuming that all meals and snacks are prepared at home.

1. Total the costs shown for individuals of the sex and age of household members.

2. Adjust the total if there are more or fewer than four persons usually eating at the family table. Monthly costs in Tables 9 and 14 are for individuals in families of four persons. Adjustment is necessary because large families tend to buy and use foods more economically than small families (22).
If the family has--

1 person	add 20 percent
2 persons	add 10 percent
3 persons	add 5 percent
4 persons	no adjustment needed
5 or 6 persons	subtract 5 percent
7 or more persons	subtract 10 percent

Changes in Estimated Costs of Food Plans Over Time

Once a food plan is developed, the quantities of foods in the plan remain the same until the plan is revised. The monthly cost estimate for the foods in that plan is based on the fixed quantities of foods in the plan. The change in the estimated cost for a plan from one month to the next depends on the changes in prices of the foods reported by the BLS. However, the estimated costs for the various food plans may change at different rates because the quantities of foods they contain differ and because prices of foods change at different rates. For example, if the price of grain products increases more sharply than other food products, the estimated cost of food plans containing relatively large amounts of grain products increases more sharply than the estimated cost of food plans that contain smaller amounts of grain products. For this reason, the relative costs of any two food plans may not remain constant over any extended period of time.

IV. Three Food Plans for Alternate Measures of Poverty

The three food plans proposed for consideration in developing alternate measures of poverty--the USDA thrifty plan (Table 6) and comparable plans to meet nutritional goals based on the FAO recommendations and the HANES/10-State standards (Tables 7 and 8)--are similar in cost (Table 9) and, with few exceptions, in kinds and amounts of foods they contain (Table 10).

The per capita costs for the plan based on FAO nutritional goals in December of 1972, 1973, and 1974 were about the same as (less than 1 percent lower than) the costs for the USDA thrifty plan, based on the RDA. However, the FAO plans for six sex-age categories cost slightly more than the corresponding thrifty plans. After all of the nutritional goals and other requirements were satisfied, these higher costs appear to be related to the recommendations for food energy. The FAO recommendations are slightly higher than the RDA for each of the six sex-age categories.

Even though FAO recommendations for several nutrients are lower than the RDA for most sex-age categories, amounts of foods in the FAO plan could not be substantially lower than in the RDA plan because of the food energy recommended and because of other specifications relating to good nutrition and palatability that are common to all of the plans. Some such specifications are the maximum percentage of calories that can be provided by fat (see page 10) and the limits on quantities of food groups (see page 13). Lower FAO recommendations for some nutrients are reflected in the assortment of foods in the FAO plan. For example, compared to the USDA thrifty plan, the FAO plan contains less milk, cheese, and ice cream because of lower calcium recommendations; and slightly less vegetables and fruit, possibly because of lower recommendations for vitamin A activity and ascorbic acid. However, amounts of cereals, fats, oils, sugars, and sweets in the FAO plan are slightly higher than in the thrifty plan.

The per capita costs for the plan based on the HANES/10-State standards in December of 1972, 1973, and 1974 were about 2-1/2 percent lower than for the USDA thrifty plan, based on the RDA. Only for two sex-age categories--males 12-14 years and nursing women--were the costs for the HANES/10-State plan higher than for USDA's thrifty plan. After all of the nutritional goals and other requirements were satisfied, these higher costs reflect HANES/10-State standards for food energy that were higher than the RDA. As for the FAO plans, amounts of foods in the HANES/10-State plans for most sex-age categories are maintained at levels similar to those in the thrifty plan because of similar food energy goals and because of the limits on the percentage of calories from fat (see page 10) and on quantities of food groups (see page 13). Most sex-age categories with HANES/10-State plans that cost less than the corresponding thrifty plans are those categories with standards for food energy below the RDA.

As mentioned on page 9, the goals for vitamin B_6, vitamin B_{12}, and magnesium for developing the HANES/10-State plans were assumed to be the same as those for the thrifty plan, because no standards for these nutrients were specified in the HANES and 10-State studies. HANES/10-State plans, if developed with no goals for these three nutrients, would cost about 4 percent less than the thrifty plan (per capita basis).

V. Three Food Plans for Alternate Measures of Near-Poverty

The three food plans proposed for consideration in developing alternate measures of near-poverty--the USDA low-cost plan (Table 11) and comparable plans to meet nutritional goals based on the FAO recommendations and the HANES/10-State standards (Tables 12 and 13)--are similar in cost (Table 14) and, with few exceptions, in kinds and amounts of foods they contain (Table 15). Per capita costs for the FAO plan were less than 1 percent lower than the costs for the USDA low-cost plan, based on the RDA; and for the HANES/10-State plan, 2-1/2 percent lower, as was true for the three plans at the cost level of the thrifty food plan (see part IV). Similarity in costs of the plans at the low-cost level reflects similarity in the three nutritional goals for food energy, after providing the goals for nutrients as well as other specifications for the plans relating to good nutrition and palatability of diets that are common to all of the plans.

VI. Conclusions

Since the first edition of the Recommended Dietary Allowances was released in 1943, the USDA has used the RDA as the nutritional goal for dietary guidance materials such as its family food plans at different cost levels. In this study, food plans have been developed at about the same or slightly lower cost than the two least costly USDA plans, using nutritional goals based on the FAO nutritional recommendations and on the standards for two DHEW studies of nutritional status. ARS nutritionists who developed these plans have no reason to believe that the FAO recommendations or the standards set for the DHEW studies are more practical or more reliable than the RDA as a basis for developing guides or cost estimates for nutritious diets for the U.S. population.

The 1974 RDA, used in developing the USDA food plans, are the levels of intake of essential nutrients considered, in the judgment of the Food and Nutrition Board, NAS-NRC, on the basis of available scientific knowledge, to be adequate to meet the nutritional needs of practically all healthy persons in the United States. They were released more recently than either the FAO recommendations or the DHEW standards. Also, the RDA are specifically designed for use with the overall U.S. population, whereas the FAO recommendations were designed for use in many countries and the DHEW standards were developed for specific use in studies of selected groups of people.

Other food plans to meet any of the three nutritional goals could be developed at the same level of cost. Essentially all food plans that might be developed at the cost level of the thrifty food plan would have certain common characteristics. Plans at such low cost are restricted in the kinds of foods they contain; they rely heavily on cereal, flour, bread, dry beans, and dry peas, and they contain less meat, poultry, fish, vegetables, and fruit than most families customarily use. Most menus based on such plans are not elaborate; however, food managers with interest and skill in buying and preparing food can serve varied and appetizing meals based on the plans.

Nutritious combinations of food groups other than those in the plans presented in this report could be developed at even lower cost. However, such combinations of food groups would differ more from consumption patterns than do the combinations in these food plans. Although nutrition educators can use the USDA food plans and guidance materials based on them to help families change amounts of food groups they ordinarily use as necessary to obtain nutritious diets, it is recognized that the further the plan deviates from the way the family usually eats, the less likely the family will be able or willing to follow the plan.

Plans at the same or lower cost than shown here could be developed if the selections of foods within food groups were limited to those foods which are the least expensive, rather than selections typical of those of survey households. For example, the thrifty food plan is assumed to contain the same proportion of fluid milk as consumed on the average by survey households with relatively low food costs. Nonfat dry milk costs only about half as much as fluid milk, yet provides as much as, or more of, most nutrients supplied by fluid milk. Therefore, a plan that assumes the use of nonfat dry milk exclusively might be developed at a lower cost than the thrifty plan. Or a plan at the same cost that includes nonfat dry milk only, might be developed to include more meat, poultry, and fish and less dry beans and grain products than the thrifty food plan.

Through special guidance materials and education, families who must or wish to economize on food are encouraged to select the most economical foods within each food group. However, for purposes of estimating the cost of an adequate diet at very low cost, average selections of foods within the food groups are assumed, recognizing that some families following the plan might not have either the skill or the opportunity to consistently select foods within food groups that are more economical than those made on the average by survey households.

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Table 1.--Recommended Dietary Allowances (1974) adapted for food plan sex-age categories 1/

Sex-age category	Food energy	Protein	Vitamin A activity	Ascorbic acid	Niacin 2/	Ribo-flavin	Thiamin	Vitamin B_6 3/	Vitamin B_{12}	Calcium	Iron	Mag-nesium 3/
	kcal	g	IU	mg	mg	mg	mg	mg	Aug	mg	mg	mg
Child:												
6-12 months	970	18	2000	35	8	0.6	0.5	0.4	0.3	540	15	70
1-2 years	1200	22	2000	39	9	.7	.6	.5	.8	730	15	130
3-5 years	1600	28	2300	40	11	1.0	.8	.8	1.3	800	12	180
6-8 years	2100	33	3000	40	14	1.2	1.1	1.1	1.8	800	10	230
9-11 years	2600	39	3900	42	17	1.3	1.3	1.4	2.4	950	13	290
Male:												
12-14 years	2800	44	5000	45	18	1.5	1.4	1.6	3.0	1200	18	350
15-19 years	3000	54	5000	45	20	1.8	1.5	2.0	3.0	1200	17	390
20-54 years	2700	56	5000	45	18	1.6	1.4	2.0	3.0	800	10	350
55 years and over	2400	56	5000	45	16	1.5	1.2	2.0	3.0	800	10	350
Female:												
12-19 years	2200	47	4000	45	14	1.4	1.1	1.9	3.0	1200	18	300
20-54 years	2000	46	4000	45	13	1.2	1.0	2.0	3.0	800	18	300
55 years and over	1800	46	4000	45	12	1.1	1.0	2.0	3.0	800	10	300
Pregnant 4/	2400	78	5000	60	16	1.7	1.4	2.5	4.0	1200	18	450
Nursing 4/	2600	68	6000	80	18	1.9	1.4	2.5	4.0	1200	18	450

1/ Adapted from Recommended Dietary Allowances, Eighth Edition, 1974 (RDA). Published by National Academy of Sciences-National Research Council (NAS-NRC), Washington, D.C. 20418. If sex-age categories differ from those for which allowances are published, the allowance for the midpoint of the range for the category was determined by interpolation.

2/ Although allowances are expressed as niacin, it is recognized that on the average 1 mg of niacin is derived from each 60 mg of dietary tryptophan.

3/ For vitamin B_6 and magnesium, for which limited food composition data are available, 80 percent of the RDA is used as a basis for the nutritional goal for the food plans.

4/ Highest of allowances for any age category for women of child-bearing age.

Note: Nutritional goals for the USDA thrifty food plan (Table 6) allow 5 percent more than the RDA for nutrients for discard of a small amount of edible food in the home; food energy levels are limited to a range of 5 to 10 percent more than the RDA. Nutritional goals for the 1974 low-cost food plan (Table 11) allow 10 percent more than the RDA for nutrients; food energy levels are limited to a range of 10 to 15 percent more than the RDA. Fat in all plans is limited to provide no more than 40 percent of food energy.

Table 2.--Food and Agriculture Organization (FAO) recommended intakes of nutrients adapted for food plan sex-age categories 1/

Sex-age category	Food energy 2/	Protein 3/	Vitamin A activity 4/	Ascorbic acid	Niacin 5/ 6/	Ribo-flavin 5/	Thiamin 5/	Vitamin B_6 7/	Vitamin B_{12}	Calcium 8/	Iron 9/	Mag-nesium 7/
	kcal	g	IU	mg	mg	mg	mg	mg	Aig	mg	mg	mg
Child:												
6-12 months	970	18	1500	20	6	0.6	0.4	0.4	0.3	550	5	70
1-2 years	1200	20	1300	20	8	.7	.5	.5	.7	480	5	130
3-5 years	1700	25	1400	20	11	1.0	.7	.8	1.3	450	5	180
6-8 years	2100	32	1800	20	14	1.3	.8	1.1	1.5	450	5	230
9-11 years	2500	38	2600	20	16	1.5	1.0	1.4	1.8	580	5	290
Male:												
12-14 years	2800	46	3400	27	19	1.7	1.1	1.6	2.0	650	8	350
15-19 years	3100	51	3700	30	20	1.8	1.2	2.0	2.0	560	6	390
20-54 years	2800	53	3800	30	19	1.7	1.1	2.0	2.0	450	5	350
55 years and over	2300	53	3800	30	15	1.4	.9	2.0	2.0	450	5	350
Female:												
12-19 years	2400	41	3500	27	16	1.4	1.0	1.9	2.0	580	11	300
20-54 years	2000	40	3800	30	14	1.2	.8	2.0	2.0	450	14	300
55 years and over	1700	40	3800	30	11	1.0	.7	2.0	2.0	450	5	300
Pregnant 10/	2700	53	3800	30	18	1.6	1.1	2.5	3.0	1100	14	450
Nursing 10/	2900	64	6000	30	19	1.8	1.2	2.5	2.5	1100	14	450

1/ Adapted from Handbook on Human Nutritional Requirements, FAO Nutritional Studies No. 28/WHO Monograph Series No. 61, Rome, 1974. If sex-age categories differ from those for which recommendations are published, the allowance for the midpoint of the age range for the category was determined by interpolation.

2/ Assumes average body weights in U.S. population used for Recommended Dietary Allowances (RDA). Also assumes light activity and decreased needs with age for energy in adults (FAO Handbook).

3/ Protein recommendations in terms of egg or milk protein were increased to allow for 75 percent efficiency of utilization of protein in U.S. mixed diets, assumed by RDA. Assumes average body weights in U.S. population used for RDA.

4/ Assumes 50 percent of IU from retinol and 50 percent from carotene.

5/ Computed as 6.6 mg niacin/1000 kcal, .6 mg riboflavin/1000 kcal, and .4 mg thiamin/1000 kcal.

6/ Although recommendations are expressed as niacin, it is recognized that on the average 1 mg of niacin is derived from 60 mg of dietary tryptophan.

7/ Recommendations were not stated for each sex-age category; therefore, RDA were used. For vitamin B_6 and magnesium, for which limited food composition data are available, 80 percent of RDA is used as a basis for the nutritional goal for the food plans.

8/ Midpoint of range recommended was used.

9/ FAO recommendations are based on proportion of calories from foods of animal origin. Lower recommendations were used, because U.S. diets contain more than 25 percent of calories from foods of animal origin.

10/ Highest recommendations for any age category for women of child-bearing age.

Note: Nutritional goals for the FAO food plan comparable to the USDA thrifty food plan (Table 7) allow 5 percent more than the FAO recommendations for discard of a small amount of edible food in the home; food energy levels are limited to a range of 5 to 10 percent more than the FAO recommendation. Nutritional goals for the FAO food plan comparable to the 1974 USDA low-cost plan (Table 12) allow 10 percent more than the FAO recommendations for nutrients; food energy levels are limited to a range of 10 to 15 percent more than the FAO recommendation. Fat in all plans is limited to provide no more than 40 percent of food energy.

Table 3.--Daily nutritional standards used for dietary evaluation in the First Health and Nutrition Examination Survey (HANES), 1971-1972, supplemented with standards used in the 10-State Nutrition Survey (10-State), 1968-1970, adapted for food plan sex-age categories 1/

Sex-age category	Food energy 2/	Protein 2/	Vitamin A activity 3/	Ascorbic acid	Niacin 4/ 5/	Ribo-flavin 5/	Thiamin 5/	Vitamin B_6 6/	Vitamin B_{12} 6/	Calcium	Iron	Mag-nesium 6/
	kcal	g	IU	mg	mg	mg	mg	mg	µg	mg	mg	mg
Child:												
6-12 months	900	20	1500	30	6	0.5	0.4	0.4	0.3	550	10	70
1-2 years	1100	21	2000	40	7	.6	.4	.5	.8	450	15	130
3-5 years	1500	28	2000	40	10	.8	.6	.8	1.3	450	11	180
6-8 years	2100	33	2500	40	14	1.2	.8	1.1	1.8	450	10	230
9-11 years	2500	42	2500	40	17	1.4	1.0	1.4	2.4	570	13	290
Male:												
12-14 years	2900	55	3100	46	19	1.6	1.2	1.6	3.0	650	15	350
15-19 years	3000	68	3500	54	20	1.7	1.2	2.0	3.0	580	18	390
20-54 years	2700	70	3500	60	18	1.5	1.1	2.0	3.0	400	10	350
55 years and over	2400	70	3500	60	16	1.4	1.0	2.0	3.0	400	10	350
Female:												
12-19 years	2200	54	3100	46	15	1.2	.9	1.9	3.0	590	18	300
20-54 years	1900	58	3500	55	13	1.1	.8	2.0	3.0	600	18	300
55 years and over	1700	58	3500	55	11	.9	.7	2.0	3.0	600	10	300
Pregnant 7/	2400	78	4500	60	16	1.3	1.0	2.5	4.0	800	18	450
Nursing 7/	3200	83	4500	60	21	1.8	1.3	2.5	4.0	1100	18	450

1/ Adapted from Preliminary Findings of the First Health and Nutrition Examination Survey, 1971-1972: Dietary Intake and Biochemical Findings, DHEW Publication No. (HRA) 74-1219-1, January 1974; and Ten-State Nutrition Survey, 1968-1970: Report V - Dietary, DHEW Publication No. (HSM) 72-8133, 1972. If sex-age categories differ from those for which standards are published, the allowance for the midpoint of the age range was determined by interpolation.

2/ Assumes average body weights in U.S. population used for Recommended Dietary Allowances (RDA).

3/ HANES standards assumed 70 percent of IU from carotene, 30 percent from retinol.

4/ Although standards are expressed as niacin, it is recognized that on the average 1 mg of niacin is derived from each 60 mg of tryptophan.

5/ Computed as 6.6 mg niacin/1000 kcal, .55 mg riboflavin/1000 kcal, and .4 mg thiamin/1000 kcal.

6/ Standards were not stated for each sex-age category; therefore, RDA were used. For vitamin B6 and magnesium, for which limited food composition data are available, 80 percent of the RDA is used as a basis for the nutritional goal for the food plans.

7/ Highest of standards for any age category for women of child-bearing age.

Note: Nutritional goals for the HANES/10-State food plan comparable to the USDA thrifty food plan (Table 8) allow 5 percent more than the HANES/10-State standards for nutrients for discard of a small amount of edible food in the home; food energy levels are limited to a range of 5 to 10 percent more than the HANES/10-State standard. Nutritional goals for the HANES/10-State food plan comparable to the 1974 low-cost food plan (Table 13) allow 10 percent more than the HANES/10-State standards for nutrients; food energy levels are limited to a range of 10 to 15 percent more than the HANES/10-State standard. Fat in all plans is limited to provide no more than 40 percent of food energy.

Table 4.--FAO recommendations 1/ compared to RDA 2/

Sex-age category	Food energy	Protein	Vitamin A activity	Ascorbic acid	Niacin	Ribo-flavin	Thiamin	Vitamin B_{12}	Calcium	Iron
	kcal	percent difference from RDA 3/								
Child:										
6-12 months.....			-20	-40	-20		-20			-70
1-2 years.....		-10	-40	-50	-10		-20	-10	-30	-70
3-5 years.....	100	-10	-40	-50			-10		-40	-60
6-8 years.....			-40	-50		10	-30	-20	-40	-50
9-11 years.....	-100		-30	-50	-10	20	-20	-20	-40	-60
Male:										
12-14 years.....			-30	-40	10	10	-20	-30	-50	-60
15-19 years.....	100	-10	-30	-30			-20	-30	-50	-60
20-54 years.....	100	-10	-20	-30	10	10	-20	-30	-40	-50
55 years and over	-100	-10	-20	-30	-10	-10	-20	-30	-40	-50
Female:										
12-19 years.....	200	-10	-10	-40	10		-10	-30	-50	-40
20-54 years.....		-10		-30	10		-20	-30	-40	-20
55 years and over	-100	-10		-30	-10	-10	-30	-30	-40	-50
Pregnant.....	300	-30	-20	-50	10	-10	-20	-20	-10	-20
Nursing.....	300	-10		-60	10	-10	-10	-40	-10	-20

1/ See Table 2.

2/ See Table 1.

3/ Rounded to nearest 10 percent.

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Table 5.--HANES/10-State standards 1/ compared to RDA 2/

Sex-age category	Food energy	Protein	Vitamin A activity	Ascorbic acid	Niacin	Ribo-flavin	Thiamin	Calcium	Iron
	kcal	percent difference from RDA 3/							
Child:									
6-12 months.....	-70	10	-20	-10	-20	-20	-20		-30
1-2 years.....	-100				-20	-10	-30	-40	
3-5 years.....	-100		-10		-10	-20	-20	-40	-10
6-8 years.....			-20				-30	-40	
9-11 years.....	-100	10	-40			10	-20	-40	
Male:									
12-14 years.....	100	20	-40		10	10	-10	-50	-20
15-19 years.....		30	-30	20		-10	-20	-50	10
20-54 years.....		20	-30	30		-10	-20	-50	
55 years and over		20	-30	30		-10	-20	-50	
Female:									
12-19 years.....		10	-20		10	-10	-20	-50	
20-54 years.....	-100	30	-10	20		-10	-20	-20	
55 years and over	-100	30	-10	20	-10	-20	-30	-20	
Pregnant.....			-10			-20	-30	-30	
Nursing	600	20	-20	-20	20	-10	-10	-10	

1/ See Table 3.

2/ See Table 1.

3/ Rounded to nearest 10 percent.

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Table 6.--USDA thrifty food plan 1/

Amounts of food for a week 2/

Sex-age category	Milk, cheese, ice cream 3/	Meat, poultry, fish 4/	Eggs	Dry beans and peas, nuts 5/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 6/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year...	4.95	.39	1.2	.15	.41	.55	.69	2.49	1.02 7/	.02	.08	.04	.04	.19	.05
1-2 years.....	3.30	.83	3.3	.17	.22	.89	.65	2.26	1.02 7/	.31	.78	.24	.11	.30	.37
3-5 years.....	3.54	.96	2.5	.28	.20	.92	.88	2.28	1.03	.37	.94	.53	.38	.74	.59
6-8 years.....	4.22	1.27	2.4	.49	.22	1.10	1.23	2.50	1.12	.62	1.40	.79	.51	.94	.84
9-11 years.....	4.92	1.61	3.4	.53	.28	1.52	1.48	3.38	1.34	.81	1.82	1.10	.60	1.20	1.10
Male:															
12-14 years.....	5.15	1.79	3.6	.67	.33	1.45	1.59	3.30	1.22	.81	2.07	1.13	.77	1.21	1.45
15-19 years.....	5.08	2.35	4.0	.43	.32	1.70	2.10	3.43	.98	.99	2.36	1.46	1.00	1.05	1.73
20-54 years.....	2.57	3.03	4.0	.44	.39	1.80	2.02	3.69	.89	.92	2.29	1.33	.95	.86	1.24
55 years and over....	2.37	2.45	4.0	.25	.51	1.85	1.75	3.77	1.09	.80	1.90	1.12	.79	.94	.73
Female:															
12-19 years.....	5.35	1.80	3.8	.28	.42	1.74	1.22	3.61	.72	.76	1.49	.84	.51	.74	1.36
20-54 years.....	2.81	2.41	4.0	.27	.52	1.86	1.51	3.39	.90	.67	1.41	.67	.57	.57	1.18
55 years and over....	2.85	1.84	4.0	.19	.60	2.02	1.26	3.73	1.12	.68	1.30	.58	.37	.45	.66
Pregnant.....	5.25 8/	2.69	4.0	.42	.56	2.17	1.89	4.03	1.13	.58	1.41	.66	.59	.58	1.48
Nursing.....	5.25 8/	3.00	4.0	.38	.57	.36	1.92	4.27	.90	.63	1.56	.82	.80	.75	1.54
Average 9/.....	3.42	2.14	3.7	.34	.42	1.67	1.52	3.37	.99	.73	1.65	.90	.63	.76	1.05

1/ Released September 1975. The Thrifty Food Plan. U.S. Department of Agriculture, CFE(Adm.) 326.

2/ Amounts are for food as purchased or brought into the kitchen from garden or farm to prepare all meals and snacks for the week. Amounts allow for a discard of about 5 percent of the edible food as plate waste, spoilage, etc.

3/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz; cottage cheese, 2-1/2 lb; ice cream or ice milk, 1-1/2 qt; unflavored yogurt, 4 cups.

4/ Bacon and salt pork should not exceed 1/3 lb for each 5 lb of this group.

5/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 lb of canned dry beans--pork and beans, kidney beans, etc.--as .33 lb.

6/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

7/ Cereal fortified with iron is recommended.

8/ For pregnant and nursing teenagers, 7 qt is recommended.

9/ Average person in the U.S. civilian population (1970).

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Table 7.--FAO food plan comparable to the USDA thrifty food plan 1/

Amounts of food for a week 2/

Sex-age category	Milk, cheese, ice cream 3/	Meat, poultry, fish 4/	Eggs	Dry beans and peas, nuts 5/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 6/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year...	5.09	0.39	1.7	0.15	0.23	0.28	0.07	2.28	1.61 7/	0.02	0.08	0.04	0.04	0.19	0.05
1-2 years.....	3.43	0.66	2.2	0.19	0.13	0.64	0.66	1.74	0.85 7/	0.26	0.62	0.31	0.23	0.48	0.36
3-5 years.....	3.62	0.96	2.2	0.35	0.17	0.84	0.95	2.01	1.08	0.47	1.12	0.53	0.40	0.79	0.65
6-8 years.....	4.20	1.27	2.3	0.49	0.21	1.08	1.23	2.44	1.13	0.63	1.43	0.78	0.51	0.94	0.84
9-11 years.....	4.67	1.55	3.0	0.52	0.25	1.40	1.42	3.10	1.32	0.80	1.78	1.02	0.58	1.15	1.07
Male:															
12-14 years.....	5.12	1.79	3.4	0.69	0.29	1.39	1.60	2.67	1.25	0.89	2.10	1.11	0.77	1.21	1.48
15-19 years.....	5.24	2.25	4.0	0.46	0.32	1.73	2.18	3.47	1.04	1.05	2.48	1.51	1.04	1.08	1.80
20-54 years.....	2.67	3.09	4.0	0.46	0.41	1.86	2.10	3.82	0.93	0.97	2.39	1.39	0.99	0.90	1.29
55 years and over....	2.13	2.19	4.0	0.29	0.48	1.76	1.72	3.62	1.12	0.75	1.82	1.06	0.75	0.90	0.70
Female:															
12-19 years.....	4.01	1.79	3.6	0.38	0.32	1.72	1.46	3.56	1.02	0.77	1.75	1.13	0.63	1.00	1.47
20-54 years.....	2.03	2.38	4.0	0.29	0.41	1.76	1.60	3.24	1.00	0.57	1.38	0.75	0.62	0.73	1.15
55 years and over....	1.70	2.19	3.2	0.24	0.49	1.89	1.35	3.62	1.15	0.43	1.03	0.53	0.46	0.49	0.60
Pregnant.....	5.25	3.07	4.0	0.36	0.57	2.44	1.95	4.36	0.92	0.68	1.69	0.94	0.83	0.89	1.55
Nursing.....	5.25	3.32	4.0	0.32	0.56	2.58	2.04	4.55	0.88	0.78	1.95	1.17	0.90	1.07	1.67
Average 8/.....	3.03	2.15	3.6	0.37	0.36	1.61	1.58	3.27	1.05	0.70	1.66	0.94	0.68	0.83	1.06

1/ See Table 2 for FAO nutritional goals. Cost was set for each sex-age category at the same relative point within the range between "minimum" and "unlimited" costs as for the USDA thrifty food plan.

2/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about 5 percent of the edible food as plate waste, spoilage, etc.

3/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz; cottage cheese, 2-1/2 lb; ice cream, 1-1/2 qt; unflavored yogurt, 4 cups.

4/ Bacon and salt pork should not exceed 1/3 lb for each 5 lb of this group.

5/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 lb of canned dry beans--pork and beans, kidney beans, etc.-- as .33 lb.

6/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

7/ Cereal fortified with iron is recommended.

8/ Average person in the U.S. civilian population (1970).

Table 8.--HANES/10-State food plan comparable to the USDA thrifty food plan 1/

Amounts of food for a week 2/

Sex-age category	Milk, cheese, ice cream 3/	Meat, poultry, fish 4/	Eggs	Dry beans and peas, nuts 5/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 6/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year...	4.65	0.36	1.3	0.15	0.33	0.43	0.07	2.27	0.92 7/	0.02	0.07	0.04	0.04	0.17	0.05
1-2 years.....	2.64	0.64	3.4	0.22	0.24	1.00	0.66	2.15	1.01 7/	0.31	0.84	0.20	0.10	0.22	0.35
3-5 years.....	3.20	0.85	1.9	0.30	0.19	0.95	0.89	1.88	0.94	0.41	0.97	0.46	0.35	0.69	0.57
6-8 years.....	4.20	1.27	2.3	0.49	0.21	1.08	1.23	2.44	1.13	0.63	1.43	0.78	0.51	0.94	0.84
9-11 years.....	4.67	1.55	3.0	0.52	0.25	1.40	1.42	3.10	1.32	0.80	1.78	1.02	0.58	1.15	1.07
Male:															
12-14 years.....	5.31	1.85	3.5	0.71	0.30	1.44	1.65	2.77	1.29	0.92	2.18	1.15	0.79	1.25	1.53
15-19 years.....	5.06	2.18	4.0	0.44	0.31	1.67	2.11	3.35	1.01	1.02	2.40	1.46	1.00	1.05	1.74
20-54 years.....	2.57	2.97	4.0	0.44	0.39	1.80	2.02	3.68	0.90	0.93	2.30	1.34	0.95	0.86	1.24
55 years and over....	2.21	2.32	4.0	0.26	0.47	1.81	1.78	3.70	1.15	0.80	1.93	1.16	0.79	0.94	0.73
Female:															
12-19 years.....	3.67	1.64	3.3	0.35	0.30	1.57	1.34	3.26	0.94	0.70	1.61	1.03	0.58	0.92	1.34
20-54 years.....	1.92	2.63	4.0	0.28	0.42	1.71	1.58	3.20	0.96	0.50	1.23	0.65	0.59	0.63	1.08
55 years and over....	1.84	2.28	4.0	0.21	0.49	1.92	1.27	3.61	1.13	0.44	1.04	0.56	0.42	0.50	0.61
Pregnant.....	5.25	2.77	4.0	0.42	0.56	2.18	1.88	4.04	1.11	0.58	1.40	0.67	0.58	0.59	1.49
Nursing.....	5.25	3.57	4.0	0.38	0.61	2.84	2.28	5.00	1.04	0.91	2.25	1.35	0.99	1.18	1.86
Average 8/.....	2.92	2.18	3.6	0.36	0.37	1.60	1.54	3.22	1.02	0.67	1.61	0.91	0.65	0.78	1.02

1/ See Table 3 for HANES/10-State nutritional goals. Cost was set for each sex-age category at the same relative point within the range between "minimum" and "unlimited" costs as for the USDA thrifty food plan.

2/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about 5 percent of the edible food as plate waste, spoilage, etc.

3/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz; cottage cheese, 2-1/2 lb; ice cream, 1-1/2 qt; unflavored yogurt, 4 cups.

4/ Bacon and salt pork should not exceed 1/3 lb for each 5 lb of this group.

5/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 lb of canned dry beans--pork and beans, kidney beans, etc.--as .33 lb.

6/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

7/ Cereal fortified with iron is recommended.

8/ Average person in the U.S. civilian population (1970).

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Table 9.--Monthly cost of food at home 1/ estimated for the USDA thrifty food plan 2/ and comparable food plans based on FAO nutritional goals 3/ and on HANES/10-State nutritional goals 4/ December 1972, December 1973, and December 1974, U.S. average

Sex-age category 5/	December 1972			December 1973			December 1974		
	USDA thrifty food plan	Comparable FAO plan	Comparable HANES/10-State plan	USDA thrifty food plan	Comparable FAO plan	Comparable HANES/10-State plan	USDA thrifty food plan	Comparable FAO plan	Comparable HANES/10-State plan
Child:									
7 months to 1 year.....	$13.60	$13.30	$12.60	$16.60	$16.30	$15.40	$18.70	$18.30	$17.30
1-2 years.....	15.50	14.30	14.00	19.10	17.60	17.20	21.60	20.30	19.50
3-5 years.....	18.50	18.90	17.00	22.80	23.30	20.90	26.60	27.30	24.40
6-8 years.....	23.60	23.50	23.50	29.10	28.90	28.90	34.00	33.80	33.80
9-11 years.....	29.60	28.20	28.20	36.40	34.70	34.70	42.60	40.60	40.60
Male:									
12-[illegible] years.....	31.70	31.00	32.10	38.90	38.20	39.60	45.50	44.70	46.30
[illegible]-19 years.....	35.00	35.60	34.40	43.00	43.70	42.30	49.70	50.70	49.00
20-54 years.....	33.60	34.70	33.40	41.30	42.70	41.10	47.10	48.80	46.90
55 years and over.....	29.70	28.00	29.20	36.40	34.30	35.80	41.90	39.50	41.20
Female:									
12-19 years.....	28.60	28.80	26.40	35.00	35.30	32.30	39.90	41.00	37.60
20-54 years.....	27.50	26.50	26.30	33.70	32.50	32.30	38.00	37.00	36.50
55 years and over.....	24.80	24.00	24.40	30.40	29.30	29.90	34.30	33.00	33.60
Pregnant.....	34.20	37.20	34.50	41.90	45.50	42.20	47.10	51.60	47.40
Nursing.....	36.40	39.60	43.00	44.60	48.50	52.60	50.30	55.10	60.00
Average 6/.....	28.09	27.80	27.33	34.48	34.13	33.57	39.40	39.20	38.44

1/ These estimates were computed from quantities in the USDA thrifty food plan (Table 6) and in the two comparable food plans (Tables 7 and 8). The costs of the food plans were first estimated by using the average price per pound of each food group paid by urban survey families with food costs of $5.00-$6.99 per person per week, Household Food Consumption Survey, 1965-66. Prices were adjusted to current levels by use of Retail Food Prices by Cities released periodically by the Bureau of Labor Statistics.

2/ Based on 1974 Recommended Dietary Allowances, National Academy of Sciences-National Research Council.

3/ Based on Handbook of Human Nutritional Requirements, Food and Agriculture Organization of the United Nations, 1974.

4/ Based on standards used in the Health and Nutrition Examination Survey (HANES), 1971-1972, and in the 10-State Nutrition Survey, 1968-1970.

5/ The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person--add 20 percent; 2-person--add 10 percent; 3-person--add 5 percent; 5- or 6-person--subtract 5 percent; 7-or-more-person--subtract 10 percent.

6/ Average person in the U.S. civilian population (1970).

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Table 10.--Weekly quantities of food groups and cost per person 1/
for the USDA thrifty food plan 2/
and comparable food plans based on FAO nutritional goals 3/
and on HANES/10-State nutritional goals 4/

Food group	Unit	USDA thrifty food plan	Comparable FAO food plan	Comparable HANES/10-State food plan
Milk, cheese, ice cream	quart	3.42	3.03	2.92
Meat, poultry, fish	pound	2.14	2.15	2.18
Eggs	number	3.7	3.6	3.6
Dry beans and peas, nuts	pound	.34	.37	.36
Dark-green, deep-yellow vegetables	pound	.42	.36	.37
Citrus fruit, tomatoes	pound	1.67	1.61	1.60
Potatoes	pound	1.52	1.58	1.54
Other vegetables, fruit	pound	3.37	3.27	3.22
Cereal	pound	.99	1.05	1.02
Flour	pound	.73	.70	.67
Bread	pound	1.65	1.66	1.61
Other bakery products	pound	.90	.94	.91
Fats, oils	pound	.63	.68	.65
Sugar, sweets	pound	.76	.83	.78
Accessories	pound	1.05	1.06	1.02
Cost of plan, December 1974		$9.09	$9.05	$8.86

1/ Average person in the U.S. civilian population (1970).

2/ See Table 6.

3/ See Table 7.

4/ See Table 8.

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Table 11.--1974 USDA low-cost food plan 1/

Amounts of food for a week 2/

Sex-age category	Milk, cheese, ice cream 3/	Meat, poultry, fish 4/	Eggs	Dry beans and peas, nuts 5/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 6/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year...	5.70	0.56	2.1	0.15	0.35	0.42	0.06	3.43	0.71 7/	0.02	0.06	0.05	0.05	.18	.06
1-2 years.....	3.57	1.26	3.6	.16	.23	1.01	.60	2.88	.99 7/	.27	.76	.33	.12	.36	.68
3-5 years.....	3.91	1.52	2.7	.25	.25	1.20	.85	2.95	.90	.30	.91	.57	.38	.71	1.02
6-8 years.....	4.74	2.03	2.9	.39	.31	1.58	1.10	3.67	1.11	.45	1.27	.84	.52	.90	1.43
9-11 years.....	5.46	2.57	2.9	.43	.38	2.13	1.41	4.81	1.24	.62	1.65	1.20	.61	1.15	1.89
Male:															
12-14 years.....	5.74	2.93	4.0	.56	.40	1.99	1.50	5.90	1.15	.67	1.88	1.25	.77	1.15	2.61
15-19 years.....	5.49	3.74	4.0	.34	.39	2.20	1.87	4.50	.90	.75	2.10	1.55	1.05	1.04	3.09
20-54 years.....	2.74	4.46	4.0	.33	.48	2.32	1.87	4.81	.93	.71	2.10	1.47	.91	.81	2.11
55 years and over....	2.61	3.63	4.0	.21	.61	2.38	1.72	4.92	1.02	.62	1.73	1.23	.77	.90	1.16
Female:															
12-19 years.....	5.63	2.53	4.0	.24	.46	2.17	1.17	4.57	.75	.63	1.44	1.05	.53	.88	2.44
20-54 years.....	3.02	3.21	4.0	.19	.55	2.34	1.40	4.17	.71	.55	1.31	.94	.59	.72	2.13
55 years and over....	3.01	2.45	4.0	.15	.62	2.54	1.22	4.57	.97	.58	1.24	.86	.38	.64	1.11
Pregnant.....	5.25 8/	3.68	4.0	.29	.67	2.80	1.65	4.99	.95	.66	1.52	1.06	.55	.78	2.56
Nursing.....	5.25 8/	4.16	4.0	.26	.66	2.99	1.67	5.33	.78	.64	1.55	1.16	.76	.91	2.70
Average 9/.....	3.70	3.11	3.8	.27	.47	2.14	1.42	4.34	.91	.58	1.53	1.07	.63	.80	1.82

1/ Released December 1974. Published in Family Economics Review, Winter 1975.

2/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about one-tenth of the edible food as plate waste, spoilage, etc.

3/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz; cottage cheese, 2-1/2 lb; ice cream, 1-1/2 qt; unflavored yogurt, 4 cups.

4/ Bacon and salt pork should not exceed 1/3 lb for each 5 lb of this group.

5/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 lb of canned dry beans--pork and beans, kidney beans, etc.--as .33 lb.

6/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

7/ Cereal fortified with iron is recommended.

8/ For pregnant and nursing teenagers, 7 qt is recommended.

9/ Average person in the U.S. civilian population (1970).

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Table 12.--FAO food plan comparable to the 1974 USDA low-cost food plan 1/

Amounts of food for a week 2/

Sex-age category	Milk, cheese, ice cream 3/	Meat, poultry, fish 4/	Eggs	Dry beans and peas, nuts 5/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 6/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year...	5.70	0.54	2.0	0.15	0.34	0.41	0.06	3.39	0.73 7/	0.02	0.06	0.05	0.05	0.18	0.06
1-2 years.....	3.98	0.94	3.0	0.14	0.20	0.97	0.61	2.71	0.65 7/	0.18	0.50	0.42	0.24	0.47	0.57
3-5 years.....	4.25	1.44	2.9	0.26	0.26	1.26	0.89	3.11	0.85	0.33	0.93	0.72	0.42	0.79	1.08
6-8 years.....	4.89	1.93	3.0	0.37	0.31	1.58	1.16	3.68	0.90	0.45	1.20	1.04	0.53	0.94	1.42
9-11 years.....	5.42	2.37	3.9	0.39	0.37	2.04	1.33	4.64	1.05	0.57	1.48	1.35	0.61	1.15	1.81
Male:															
12-14 years.....	5.91	2.80	4.0	0.53	0.40	1.98	1.50	5.89	1.01	0.65	1.78	1.43	0.81	1.21	2.60
15-19 years.....	5.84	3.69	4.0	0.35	0.40	2.27	2.02	4.65	0.84	0.78	2.09	1.77	1.08	1.08	3.19
20-54 years.....	2.93	4.65	4.0	0.32	0.51	2.47	1.96	5.16	0.80	0.75	2.09	1.54	1.01	0.90	2.18
55 years and over....	2.36	3.46	4.0	0.20	0.56	2.27	1.59	4.72	0.90	0.57	1.57	1.28	0.79	0.90	1.06
Female:															
12-19 years.....	4.47	2.84	4.0	0.29	0.41	2.29	1.35	4.83	0.82	0.56	1.46	1.33	0.66	0.99	2.60
20-54 years.....	2.28	3.41	4.0	0.21	0.48	2.28	1.42	4.17	0.71	0.44	1.22	0.97	0.65	0.73	1.96
55 years and over....	1.87	2.95	4.0	0.16	0.52	2.38	1.19	4.49	0.97	0.33	0.92	0.73	0.45	0.61	0.95
Pregnant.....	5.25	4.39	4.0	0.22	0.63	3.07	1.76	5.49	0.66	0.54	1.51	1.19	0.85	0.99	2.76
Nursing.....	5.25	4.73	4.0	0.24	0.67	3.29	1.90	5.93	0.73	0.59	1.67	1.33	0.94	1.06	2.92
Average 8/.....	3.41	3.20	3.8	0.27	0.45	2.14	1.45	4.41	0.83	0.52	1.44	1.15	0.70	0.84	1.80

1/ See Table 2 for FAO nutritional goals. Cost was set for each sex-age category at the same relative point within the range between "minimum" and "unlimited" costs as for the 1974 USDA low-cost food plan.

2/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about one-tenth of edible food as plate waste, spoilage, etc.

3/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz; cottage cheese, 2-1/2 lb; ice cream, 1-1/2 qt; unflavored yogurt, 4 cups.

4/ Bacon and salt pork should not exceed 1/3 lb for each 5 lb of this group.

5/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 lb of canned dry beans--pork and beans, kidney beans, etc.--as .33 lb.

6/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

7/ Cereal fortified with iron is recommended.

8/ Average person in the U.S. civilian population (1970).

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Table 13.--HANES/10-State food plan comparable to the 1974 USDA low-cost food plan 1/

Amounts of food for a week 2/

Sex-age category	Milk, cheese, ice cream 3/	Meat, poultry, fish 4/	Eggs	Dry beans and peas, nuts 5/	Dark-green, deep-yellow vegetables	Citrus fruit, tomatoes	Potatoes	Other vegetables, fruit	Cereal	Flour	Bread	Other bakery products	Fats, oils	Sugar, sweets	Accessories 6/
	Qt	Lb	No	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb	Lb
Child:															
7 months to 1 year...	5.19	0.59	2.0	0.14	0.33	0.39	0.06	3.22	0.67 7/	0.02	0.06	0.04	0.04	0.17	0.05
1-2 years.....	2.69	1.24	4.0	0.20	0.26	0.96	0.58	2.80	0.95 7/	0.28	0.79	0.32	0.11	0.23	0.56
3-5 years.....	3.75	1.30	2.6	0.23	0.23	1.12	0.79	2.75	0.75	0.29	0.82	0.64	0.37	0.69	0.96
6-8 years.....	4.89	1.94	3.0	0.37	0.31	1.58	1.16	3.68	0.90	0.45	1.20	1.04	0.53	0.94	1.42
9-11 years.....	5.42	2.37	3.9	0.39	0.37	2.04	1.33	4.64	1.05	0.57	1.48	1.35	0.61	1.15	1.81
Male:															
12-14 years.....	6.13	2.91	4.0	0.54	0.41	2.05	1.55	4.03	1.04	0.67	1.84	1.48	0.84	1.26	2.70
15-19 years.....	5.65	3.57	4.0	0.33	0.39	2.20	1.95	4.50	0.81	0.75	2.02	1.71	1.05	1.04	3.07
20-54 years.....	2.83	4.49	4.0	0.30	0.49	2.39	1.89	4.97	0.77	0.72	2.01	1.48	0.97	0.86	2.10
55 years and over....	2.46	3.62	4.0	0.20	0.58	2.37	1.66	4.91	0.94	0.60	1.65	1.35	0.83	0.94	1.09
Female:															
12-19 years.....	4.10	2.66	3.7	0.26	0.38	2.10	1.23	4.44	0.74	0.51	1.33	1.22	0.61	0.91	2.38
20-54 years.....	2.18	3.50	4.0	0.20	0.48	2.19	1.35	4.04	0.75	0.42	1.19	0.82	0.56	0.66	1.91
55 years and over....	2.00	2.99	4.0	0.15	0.53	2.39	1.18	4.49	0.94	0.36	0.96	0.76	0.46	0.63	0.94
Pregnant.....	5.25	3.87	4.0	0.29	0.62	2.76	1.70	5.08	0.85	0.48	1.32	0.98	0.63	0.79	2.54
Nursing.....	5.25	5.19	4.0	0.29	0.73	3.63	2.12	6.48	0.85	0.69	1.93	1.56	1.04	1.17	3.20
Average 8/.....	3.27	3.19	3.8	0.26	0.44	2.09	1.41	4.31	0.83	0.52	1.41	1.10	0.66	0.80	1.73

1/ See Table 3 for HANES/10-State nutritional goals. Cost was set for each sex-age category at the same relative point with the range between "minimum" and "unlimited" costs as for the 1974 USDA low-cost food plan.

2/ Amounts are for food as purchased or brought into the kitchen from garden or farm. Amounts allow for a discard of about one-tenth of the edible food as plate waste, spoilage, etc.

3/ Fluid milk and beverage made from dry or evaporated milk. Cheese and ice cream may replace some milk. Count as equivalent to a quart of fluid milk: Natural or processed Cheddar-type cheese, 6 oz; cottage cheese, 2-1/2 lb; ice cream, 1-1/2 qt; unflavored yogurt, 4 cups.

4/ Bacon and salt pork should not exceed 1/3 lb for each 5 lb of this group.

5/ Weight in terms of dry beans and peas, shelled nuts, and peanut butter. Count 1 lb of canned dry beans--pork and beans, kidney beans, etc.--as .33 lb.

6/ Includes coffee, tea, cocoa, soft drinks, punches, ades, leavenings, and seasonings.

7/ Cereal fortified with iron is recommended.

8/ Average person in the U.S. civilian population (1970).

Table 14.--Monthly cost of food at home 1/ for the 1974 USDA low-cost food plan 2/ and for comparable food plans based on FAO nutritional goals 3/ and HANES/10-State nutritional goals 4/ December 1972, December 1973, and December 1974, U.S. average

Sex-age category 5/	December 1972			December 1973			December 1974		
	USDA low-cost food plan	Comparable FAO plan	Comparable HANES/10-State plan	USDA low-cost food plan	Comparable FAO plan	Comparable HANES/10-State plan	USDA low-cost food plan	Comparable FAO plan	Comparable HANES/10-State plan
Child:									
7 months to 1 year...	$17.00	$16.90	$15.90	$20.40	$20.30	$19.20	$22.90	$22.80	$21.50
1-2 years.....	20.00	18.50	18.30	24.20	22.30	22.20	27.50	25.70	25.10
3-5 years.....	23.70	24.70	22.00	28.60	29.80	26.40	33.10	34.70	30.80
6-8 years.....	30.70	30.70	30.70	37.10	36.90	37.00	43.10	43.00	43.10
9-11 years.....	38.40	37.00	37.00	46.20	44.40	44.40	53.80	51.80	51.80
Male:									
12-14 years.....	41.00	40.70	42.10	49.50	49.00	50.80	57.40	57.10	59.10
15-19 years.....	45.40	46.60	45.10	54.80	56.20	54.30	63.00	64.80	62.60
20-54 years.....	44.30	45.80	44.10	53.40	55.10	53.10	60.60	62.60	60.40
55 years and over....	38.80	36.70	38.30	46.60	44.20	46.00	53.20	50.50	52.60
Female:									
12-19 years.....	36.30	37.80	34.80	44.10	45.20	41.70	50.80	52.40	48.30
20-54 years.....	35.60	34.50	33.80	42.70	41.40	40.60	48.70	47.10	46.00
55 years and over....	31.90	30.60	31.00	38.20	36.60	37.10	43.60	41.50	42.00
Pregnant.....	44.00	47.90	44.30	52.80	57.50	53.10	60.00	65.30	60.20
Nursing.....	46.80	50.90	55.50	56.10	61.00	66.50	63.80	69.40	75.80
Average 6/.....	36.45	36.33	35.56	43.85	43.66	42.75	50.17	50.03	48.89

1/ These estimates were computed from quantities in the 1974 USDA low-cost food plan (Table 11) and in the two comparable food plans (Table 12 and 13). The costs of the food plans were first estimated by using the average price per pound of each food group paid by urban survey families with food costs of $7.00-$8.99 per person per week, Household Food Consumption Survey, 1965-66. Prices were adjusted to current levels by use of Retail Food Prices by Cities released periodically by the Bureau of Labor Statistics.

2/ Based on 1974 Recommended Dietary Allowances, National Academy of Sciences-National Research Council.

3/ Based on Handbook of Human Nutritional Requirements, Food and Agriculture Organization of the United Nations, 1974.

4/ Based on standards used in the Health and Nutrition Examination Survey (HANES), 1971-1972, and in the 10-State Nutrition Survey, 1968-1970.

5/ The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person--add 20 percent; 2-person--add 10 percent; 3-person--add 5 percent; 5- or 6-person--subtract 5 percent; 7-or-more-person--subtract 10 percent.

6/ Average person in the U.S. civilian population (1970).

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Table 15.--Weekly quantities of food groups and cost per person 1/ for the 1974 USDA low-cost food plan 2/ and comparable food plans based on FAO nutritional goals 3/ and on HANES/10-State nutritional goals 4/

Food group	Unit	1974 low-cost food plan	Comparable FAO food plan	Comparable HANES/10-State food plan
Milk, cheese, ice cream	quart	3.70	3.41	3.27
Meat, poultry, fish	pound	3.11	3.20	3.19
Eggs	number	3.8	3.8	3.8
Dry beans and peas, nuts	pound	.27	.27	.26
Dark-green, deep-yellow vegetables	pound	.47	.45	.44
Citrus fruit, tomatoes	pound	2.14	2.14	2.09
Potatoes	pound	1.42	1.45	1.41
Other vegetables, fruit	pound	4.34	4.41	4.31
Cereal	pound	.91	.83	.83
Flour	pound	.58	.52	.52
Bread	pound	1.53	1.44	1.41
Other bakery products	pound	1.07	1.15	1.10
Fats, oils	pound	.63	.70	.66
Sugar, sweets	pound	.80	.84	.80
Accessories	pound	1.82	1.80	1.73
Cost of plan, December 1974		$11.58	$11.55	$11.28

1/ Average person in the U.S. civilian population (1970).

2/ See Table 11.

3/ See Table 12.

4/ See Table 13.

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